



I-0066
February 29, 2015

Kim Tisa
PCB Coordinator
US Environmental Protection Agency, Region 1
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3912

RE: **Revised Risk-Based Disposal Plan – Former Digester Building
Ipswich Waste Water Treatment Plant Facility
Fowlers Lane, Ipswich, Massachusetts**

Dear Ms. Tisa:

On behalf of the Town of Ipswich, Massachusetts, Tighe & Bond is submitting this *revised* Risk-Based Cleanup and Disposal Plan ("Plan") for PCB contaminated building materials associated with the former Digester Building at the Ipswich Wastewater Treatment Plant (WWTP) facility. This revised plan addresses EPA's comments to Tighe & Bond Risk-Based Cleanup and Disposal Plan dated September 5, 2014. EPA's comments on the plan and Tighe & Bond's response are provided below:

EPA Comment 1: All information required to support a risk-based disposal plan was not included in the submitted information. For example, a risk-based disposal plan should consider remedial alternatives with estimated costs. While a few options were discussed (i.e., epoxy coatings/barriers) no other information was provided nor were other options, such as additional scarification to remove PCBs discussed. Other information may also be needed to support a remedial alternative (e.g., air sampling, etc.), structural considerations, cost, etc.

Response: The plan has been revised to address many of the factors noted above.

EPA Comment 2: Please review the attached risk-based disposal option check list and ensure that all required and necessary information is provided.

Response: Tighe & Bond reviewed the risk-based disposal option check list and has revised the plan to include additional relevant sections, including data usability and quality assurance/control and certification as required per TSCA.

EPA Comment 3: Please provide the square footage of the building and square footage of wall surfaces where PCBs greater than (" $>$ ") 1 ppm are present.

Response: The building/structure is very small. The total floor square footage of the building is 950± square feet (both ground/first floor and basement). The total square footage of surfaces where PCBs are greater than 1 ppm in the concrete/CMU substrate walls is 2,280± square feet.

EPA Comment 4: *The certification required under 40 CFR § 761.61(a)(3)(i)(E) was not provided.*

Response: The required certification has been provided in Section 5.

EPA Comment 5. – On Page 1. *It is indicated that paint was identified on interior concrete walls. However, subsequently there is reference to both concrete and CMU. As these two different material types are generally not considered the same, please clarify the construction of this building.*

Response: The foundation of the building (basement level) is constructed of poured concrete. The first/ground floor level of the building is constructed of concrete masonry units (CMU). As indicated on the Site Plan, samples designated with the prefix “concrete” are from the foundation wall of the basement; samples designated with the prefix “CMU” are from the first/ground floor.

EPA Comment 6 – On Page 2. 1st paragraph. *There is a discussion of 2012 sampling associated with the aeration tank wall (PCB-03) and the former digester tank wall (P-03). The only figure provided with sampling locations is H-102. None of these referenced samples were found on this figure. The only tank shown is the “sludge tank” and it is unclear how that is related to either the aeration or digester tank wall sampling locations. Please clarify.*

Response: Figure H-102 has been designated Figure 2 in the new revised plan. Samples collected on March 2, 2012 from locations PCB-02, PCB-03 and PCB-04 are not associated with the former Digester Building that is the subject of this submittal and were collected from other metal system components that were abated/removed as a Bulk Product. Thus, these sample locations are not shown on Figure 1 and have been removed from the data summary Table 1, which also has been revised.

EPA Comment 7 – On Page 2, 6th paragraph. *EPA was unable to find CMU Block-01 and CMU Block-02 on Figure H-102, which EPA assumes is the referenced “Site Plan”.*

Response: The locations of samples CMU Block -01 (0.934 ppm) and CMU Block-02 (164 ppm) are shown on Figure 2.

EPA Comment 8 – ON Page 2. *Wipe samples. Please clarify if the hexane wipe samples were collected first or second at each sampling location.*

Response: The wipe samples (Wipe-01 through Wipe-06 – hexane and DI-Water) were collected from the same walled surface but adjacent to each other.

EPA Comment 9a - Page 3. Paragraph 5 - *It is stated that the average PCB concentration in the wipe samples is 60.8 ppm. The units reported are incorrect. Wipe samples should be reported in $\mu\text{g}/100\text{ cm}^2$, not in ppm as there is no correlation between these units. Accordingly, cleanup standards that apply to non-porous surfaces may not be used interchangeably with the cleanup standards for porous surfaces.*

Response: We acknowledge that the associated units with the PCB in in the wipe samples was a typographic error and has been corrected to read $\mu\text{g}/100\text{ cm}^2$. These units have been changed accordingly in the revised plan.

EPA Comment 9b - Page 3. Paragraph 5- *With respect to the use of saline versus hexane for wipe samples, the PCB wipe sampling guidance specifies that a solvent be used. Generally one would expect to see higher concentrations with a solvent as PCBs are hydrophobic. However, some of the variability seen in the data could be attributable to the concrete and how much if any of the concrete was removed as a function of the sampling.*

Response: Yes we also noted the variability in the wipe results and would have expected higher results from the hexane wipes. The two instance where the wipe results for DI water exceeded the hexane results was when the PCB concentration was relatively low. For the other samples, the hexane results exceeded the DI results

Please note that the DI samples were only collected in the event that an additional qualitative discussion was necessary with respect to the interpretation of wipe sample results.

EPA Comment 10a - Pages 3 and 4. Risk Characterization - *EPA typically requires that risk calculations for an EPC based on the 95% Upper Confidence Limit (UCL) of the Mean which we will use for site decisions. Thus, the use of an "average concentration" (as mentioned in paragraph 5 on this page) would not be appropriate.*

Response: The greatest of the post-remedial wipe samples that were collected using hexane and DI water will be used for general risk characterization purposes. Summary statistics of the wipe samples were calculated using EPA's ProUCL, ver. 5.0 software and were as follows:

EPCs – PCBs in Wipe Samples (ug/100-cm²)

Location	Higher of Hexane/DI-Water
No. of Samples	6
Whole Building	60.8 (Mean) 98.56 (95 UCL)
First/Ground Floor (3 samples)	70.5 (Max)
Basement (3 samples)	137 (Max)

The 95UCL mean statistic (98.56 ug/100-cm²) for the greatest of the hexane and DI data will be used as the exposure point concentration (EPC) to estimate risk due to dermal exposures. This EPC is less than the EPA/TSCA low-occupancy standard for non-porous surfaces of 100 ug/100-cm² (although the samples were collected from porous surfaces).

EPA Comment 10b - Pages 3 and 4. Risk Characterization - The Town has provided no basis to support that dermal contact is the only pathway of concern. For a risk assessment, all pathways must be considered, not just the dermal pathway. While EPA may consider technical/structural limitations for engineered controls and/or barriers, the proposed risk-based remedial action must be supported. While the use of the building is infrequency, the building is still used. Please also be aware that EPA has seen inhalation as an important pathway in buildings, so it is relevant and must be considered.

Response: The risk evaluation for the dermal exposure pathway has been updated and revised. In addition, indoor air sampling was conducted in May 2015 in order to evaluate the inhalation pathway. The updated risk evaluation for these pathways is presented in Section 3.

EPA Comment 10c - Pages 3 and 4. Risk Characterization Page 4. Conclusions. It is indicated here that PCB bulk product wastes were removed from the building interior in July 2013. However, previously on page 2, it indicated that the date was October 2012. Please clarify.

Response: The PCB bulk product waste was removed in July 2013 which was incorrectly stated on page 2. The date of waste management and disposal is described in Section 4 of the revised plan and is as confirmed by the date on the waste manifests provided in Appendix F.

If you have any questions, please feel free to contact me at (508) 471-9642.

Very truly yours,

TIGHE & BOND, INC.

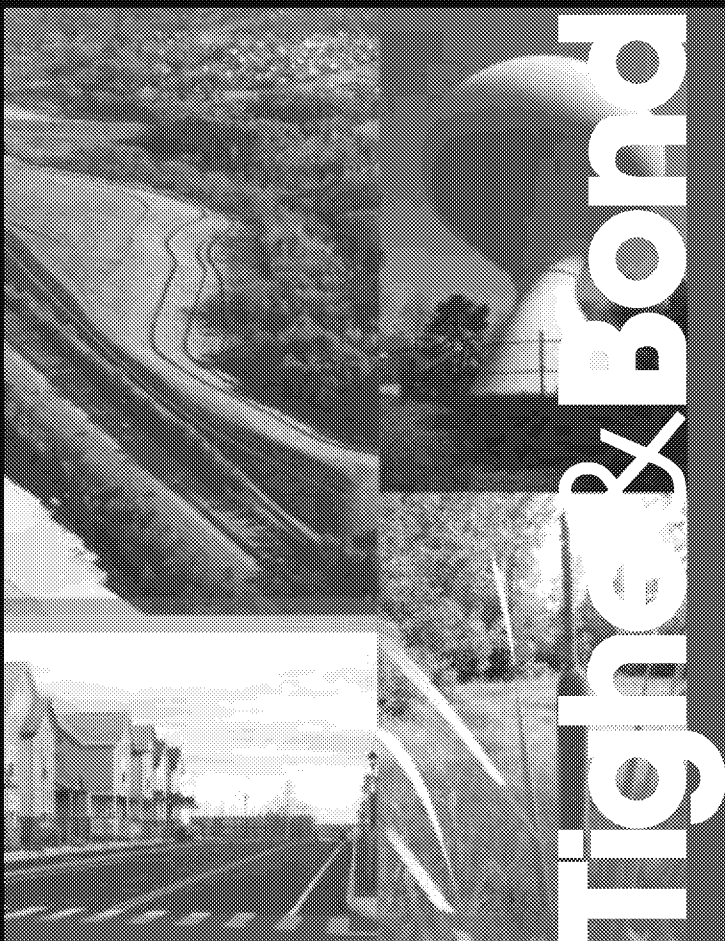


Marc J. Richards, P.E., LSP
Vice President

Enclosure: Revised EPA Risk-Based Cleanup and Disposal Plan

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Former Digester Building
Ipswich Waste Water Treatment Plant Facility

Revised Risk-Based Disposal Plan

Prepared For:

**Town of Ipswich
Ipswich, MA**

February 29, 2016

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Section 1

Introduction

1.1 Purpose

Tighe & Bond, on behalf of the Town of Ipswich, Massachusetts, has prepared this risk-based cleanup and disposal plan for PCB contaminated building materials located inside the former Digester Building at the Ipswich Waste Water Treatment Plant (WWTP) facility ("the Site") in Ipswich, Massachusetts. The Site and the Former Digester Building which are located on Fowlers Lane, are shown on Figure 1 – Site Location Plan in Appendix A.

This plan was prepared in accordance with the requirements of 40 CFR 761.61(c) and 761.62(c) of the Toxic Substances Control Act (TSCA) regulations and is being submitted to EPA for approval. In accordance with the Section 761.61(c) of the TSCA regulations, a copy of the original "cleanup plan" as well as this revised cleanup plan was posted on the Town website in accordance with the 30-day public notice/comment requirements under TSCA.

1.2 Site Description and Background

The Town of Ipswich owns and operates the wastewater treatment facility (WWTP) designed to treat commercial and residential flows. The WWTP began operations in 1959. The plant's original design consisted of primary clarification, anaerobic digestion and a sludge drying bed. In 1963, the plant made modifications to the digester and added another sludge drying bed. In 1972, significant upgrades were made to the WWTP to increase the level of treatment and capacity. Minor upgrades were also completed in 1995.

1.3 Building Description and Project Upgrades

The Former Digester Building houses a former digester (now used to process sludge aka Sludge tank No. 1). A two-story building structure is connected to the south side of the Sludge tank. The structure is small and consists of approximately 950± square feet of space (both floors). Each floor is approximately 475± SF in area and has a height of 10 feet. The control panel and systems are located on the basement floor and is accessible via a staircase inside the building.

In 2012, prior to renovation of the Former Digester Building, Tighe & Bond conducted a building audit to identify the potential presence of PCBs on interior painted steel piping and on the interior concrete walls. In 2013, the Former Digester Building was renovated to remove a former CMU infill area in the basement, to upgrade system controls and to remove piping. The control panel for the new system is located in the basement of the building. The upstairs of the building is used as a pass through and to access the control panel in the basement and for storage of small equipment (i.e. lawn mower in summer and snow blower in winter).

Section 2

Sampling and Remedial Activities

In 2012, prior to building renovation, PCBs were found in several painted concrete surfaces and concrete masonry units (CMUs) located on the basement and on the first/ground floor of the Former Digester Building. Following this discovery, Tighe & Bond conducted additional sampling to further evaluate the extent of PCBs in paint and in the concrete substrate and structural surfaces.

This Plan addresses the residual PCBs present on the interior concrete and CMU block walls of the building. A summary of the sampling activities conducted between March 2012 and May 2015 in support of this cleanup is shown on the attached Tables 1 and 2. The laboratory analytical data reports for these activities are provided in Appendix C.

2.1 Pre-Remedial Paint Chip and Concrete Sampling, 2012

On March 2, 2012 and August 21 2012, Tighe & Bond conducted an oil and hazardous materials audit of the former digester building and various other exterior structures at the WWTP facility. Tighe & Bond personnel collected seven (7) paint samples from the interior of the former Digester Building (PCB-01, PCB-05 and P-01 through P-05). The location of these paint samples are show on Figure 2. Paint samples collected from the former Digester Building included: brown paint from interior digester piping (PCB-01), a white paint sample from interior walls (PCB-05), an off-white paint sample from the basement walls (P-01 and P-02), an off-white paint from the former digester tank wall (P-03) and two off-white paint samples from the first floor/ground level walls (P-04 and P-05). The samples were submitted to Alpha Analytical Laboratory in Westborough for analysis of PCBs by EPA Method 8082 (Soxhlet Extraction).

PCBs were detected in the 7 paint chip samples from inside the former Digester Building above 50 parts-per-million (ppm). These results are summarized in Table 1. Based on the paint chip sampling results, the identified PCB painted surfaces required management in accordance with the Toxic Substance Control Act (TSCA) at 40 CFR 761.62. Tighe & Bond estimated the total PCB-impacted surfaces containing PCBs > 1 ppm included all four interior walls on both the basement and the first floor/ground level of the building, including miscellaneous interior piping. In total, approximately 2,280 SF of area of the walls contain PCB paint greater than 50 ppm.

Also on August 21, 2012, Tighe & Bond collected eight (8) substrate samples from the basement and first/ground floor of the building for analysis of PCBs. Samples were collected of both the structural concrete foundation structures and from the CMUs (concrete block). Samples were submitted to Alpha Analytical for analysis for PCBs by EPA Method 8082 (Soxhlet Extraction).

2.2 Sand Blasting Activities, October 2012

A contractor for the remediation work was selected through a public bidding process by the Town of Ipswich. In October 2012, the selected contractor utilized abrasive sand blasting of the interior walls and piping to remove the PCB impacted interior painted wall

surfaces of the former digester building. The concrete walled surfaces (concrete structural foundation and CMUs) within the building that was sandblasted are shown in Figure 2 in Appendix A.

During renovation activities, the painted surfaces were abated as a performance based proposal project under 761.62(a). Paint was removed under full-containment using sand blast methods to remove paint from metal and concrete surfaces. For the metal (non-porous) surfaces, the surfaces were decontaminated per 761.79(b 3B). Paint was removed to a "no-visible paint" standard from the porous surfaces. Subsequent to removal activities, verification samples (bulk and wipes) were collected from the porous surfaces that remained.

The sand blasting media was managed as "PCB bulk product waste" and was containerized for offsite disposal in October 2012. Approximately 4,000 kilograms of PCB-impacted media and bulk waste product were transported to CWM Chemical Services in Model City, New York for disposal. A copy of the hazardous waste manifest is included in Appendix D.

2.3 Post-Remedial PCB Sampling, 2013-2014

2.3.1 Concrete Substrate Sampling

On October 1, 2013, Tighe & Bond collected substrate samples for PCB analysis from the interior wall surfaces from both the first ground floor and the basement. In total, 11 substrate samples were collected from the interior walls of the former digester building. These samples are identified as CONC-1 through CONC-07 and CMU-8 through CMU-11 and are shown on Figure 2. The samples were collected with a hammer drill in general accordance with the EPA's *Standard Operating Procedure for Sampling Concrete in the Field* and were analyzed by EPA Method 8082 via 3840 (Soxhlet Extraction Method).

On March 5, 2014, Tighe & Bond collected four (4) additional post-sand blasting samples from inside the building. Two samples (Concrete-01, Concrete-02) were collected from the basement wall and two samples (CMU Block-01, and CMU Block-02) were collected from the first/ground floor of the building. These sampling locations are shown on Figure 2. These post remediation concrete samples were submitted to ESS Laboratory (ESS) in Cranston, Rhode Island for analysis of PCBs.

Additionally on March 5, 2014, next to each of these sample locations, Tighe & Bond collected four concrete and CMU samples ("A" series samples) to assess whether residual dust was present that may be contributing to elevated PCB detections. These samples were designated Concrete-01A, Concrete-02A and CMU Block-01A and CMU Block-02A. The "A" samples were collected after the surface of the concrete was manually scrubbed with a wire brush and then cleaned with distilled water to remove any potential dust present. These sampling locations are shown on Figure 2. These post remediation concrete samples were submitted to ESS Laboratory (ESS) in Cranston, Rhode Island for analysis of PCBs.

The paired concrete and CMU results from both floor of the building were used to assess whether residual dust was present. The results of this sampling is provided in Table 1 in Appendix C and summarized below:

Post Sand Blasting Comparison (mg/kg)			
Basement West Wall		First/Ground Floor – South Wall	
Concrete – 01 1.1	Concrete-01A 63.3	CMU Block -01 254	CMU Block-01A 266
Basement – East Wall		First/Ground Floor – Interior Wall	
Concrete -02 69.3	Concrete-02A 70.2	CMU Block -02 219	CMU Block-02A 363

The sampling results indicated that PCBs concentrations showed little reduction between the “before” and “after” samples in both the concrete and the CMUs indicating that the interior surfaces of the building were adequately cleaned following sandblasting and residual dust was not present.

The PCB concentrations in the post-remedial CMU samples were 4 to 5 times greater than in the concrete in the basement, which is expected given the porous nature of CMU block as compared to concrete.

2.3.2 Wipe Sampling

On March 5, 2014 Tighe & Bond collected 12 samples (6 paired sets) of wipe samples from the sand blasted concrete and CMU wall surfaces. Wipe samples Wipe-01 to Wipe-03 were collected from the basement and samples Wipe-04 to Wipe-06 were collected from the first/ground floor. The wipe samples were collected with laboratory provided pre-moistened hexane wipes. A second set of samples was also collected at each sample location using pre-moistened de-ionized (DI)-water wipes for general comparison purposes only. The hexane and DI wipe samples were collected from two separate surfaces located adjacent to each in the same location. The wipe samples were submitted to ESS for analysis of PCBs by EPA Method 8082 (Soxhlet Extraction). The PCB bulk samples and wipe sample results are summarized in Table 1.

2.4 Post-Remedial Indoor Air Sampling, 2015

On May 5, 2015, Tighe & Bond conducted air sampling for PCBs inside the former Digester Building. Two (2) indoor air samples were collected over an 8-hour sampling period from the basement and from the first/ground floor of the Former Digester Building. The building was closed and no persons entered the building during the testing. The air sampling system was calibrated prior to use and air samples were collected using a low volume air pump fitted with a polyurethane foam (PUF) sampling cartridge in accordance with EPA Method TO-10A. The collected air samples were analyzed for total PCBs and homologs by EPA Modified Method 680 (GC/MD). The air samples were submitted to Con-Test Analytical Laboratory of East Longmeadow, Massachusetts for analysis.

2.5 Summary of Sampling Results

2.5.1 Basement Level

- Concrete Substrate - Post remediation concrete substrate samples contained PCB concentrations (Aroclor 1254) ranging from 1.1 ppm to 477 ppm in the basement. The PCB concentrations detected in the building substrate (concrete) are above the PCB Cleanup Level for High Occupancy Areas of 1 ppm in porous surfaces. The concentrations detected also exceed the PCB Cleanup Level for Low Occupancy Areas of >25 ppm and ≤ 50 ppm (with signage and deed restriction) and ≤ 100 ppm (with required cap and deed restriction). Sampling after additional cleaning of the concrete substrate surfaces did not show a reduction in PCB concentrations.
- Porous Concrete Surfaces – The post remediation wipe sampling data indicates that PCB concentrations are present on concrete surfaces from 4.8 ppm to 137 ppm (hexane results).
- Indoor Air – Based upon the May 5, 2015 sampling event conducted after remediation, PCBs are present in indoor air. The total PCB concentration in indoor air in the basement was 4.2 micrograms per cubic meter (ug/m³).

2.5.2 First Floor/Ground Level

- CMU Substrate - Post remediation CMU samples contained PCB concentrations (Aroclor 1254) in the CMU ranged from 219 ppm to 556 ppm in the first floor/ground level. The PCB concentrations in the substrate (CMUs) are above the PCB Cleanup Level for High Occupancy Areas of 1 ppm in porous surfaces. The concentrations detected also exceed the PCB Cleanup Level for Low Occupancy Areas of >25 ppm and ≤ 50 ppm (with signage and deed restriction) and ≤ 100 ppm (with required cap and deed restriction).
- Porous CMU Surfaces – The post remediation wipe sample data indicates that PCB concentrations are present on CMU surface from 61.1 ppm to 70.5 ppm (hexane results).
- Indoor Air – Based upon the May 5, 2015 sampling event conducted after remediation, PCBs are present in indoor air. The total PCB concentration in indoor air on the first/ground floor was 1.3 ug/m³.

Section 3

Risk Evaluation

In accordance with TSCA regulations, the Town of Ipswich is seeking a risk-based approval for the sampling, cleanup, and disposal of PCB Remediation Waste at the former Digester Building under 40 CFR §761 .61(c). In support of this approval request, Tighe & Bond conducted a semi-quantitative site-specific risk assessment to address potential human health risks associated with residual PCBs in building materials. Risk calculation documentation is provided in Appendix F.

3.1 Data Usability and Quality Assurance

Sampling included collection of paint chip samples, bulk concrete and CMU substrate samples, surface wipe samples from porous surfaces and indoor air samples. These samples were collected and analyzed in accordance with standard industry practices and EPA approved field and laboratory methods and protocols, which are described below.

Paint Chip Samples (Alpha Report L1213454 and L1215096)

Paint chips were sampled from both porous and non-porous surfaces from inside the former Digester Building. These paint chips samples were analyzed by Alpha Analytical of Westborough, MA by EPA Method 8082 using extraction Method 3540 (Soxhlet). These samples accordance with the chain of custody and no significant deviations were encountered during the preparation, except sample PCB-05 was received analyzed for PCBs past the method required holding time per Tighe & Bond's request. These results did not impact usability of the sample data.

Concrete (Bulk) Samples (Alpha Reports L1213454, ESS Report 1310195 and ESS 1403083 and ESS 1403085)

Concrete substrate samples from walls for PCB analysis were collected in accordance with *EPA SOP for Sampling of Porous Surfaces for PCBs dated May 2011*. Pre-sand blasting concrete substrate samples were analyzed by Alpha Analytical of Westborough, MA by EPA Method 8082 using extraction Method 3540 (Soxhlet). Post-sand blasting samples were analyzed by ESS Laboratory of Cranston, Rhode Island, a Massachusetts state certified lab. Samples were analyzed for PCBs by EPA Method 8082A using extraction Method 3540 (Soxhlet). All data met the required QA/QC requirements for analysis of the method were met, except for the following:

- The ESS report 1310195 indicated that surrogate recoveries for all 12 samples (Conc-01 to Conc-012 plus a duplicate) were diluted below the method reporting limits (MRL) in these samples. *This potentially biases the post-sand blasting PCB results low and thus actual concentrations may be higher than reported.*
- The ESS report 1403083 indicated that the surrogate recoveries for four of the concrete samples (Concrete-01 and -02) and CMU-Block 01 and 02 were diluted below the method reporting limits (MRL) in these samples. *This potentially biases the post-sand blasting PCB results low and thus actual concentrations may be higher than reported.*

- The ESS report 1403085 indicated that the surrogate recoveries for the four concrete/CMU samples (Concrete-01A and -02A) and CMU-Block 01A and 02A were diluted below the method reporting limits (MRL) in these samples. *This potentially biases the post-sand blasting PCB results low and thus actual concentrations may be higher than reported.*

Surface Wipe Samples (Lab Report ESS 1403083)

The laboratory did not report any quality assurance or data usability issues for these samples.

Indoor Air Samples (Lab Report Con-Test 15E01081)

Air samples were collected using sorbent cartridges containing pre-cleaned open-cell polyurethane foam or PUFs as the sampling media, and were analyzed by gas chromatograph coupled mass spectrometer (GC/MS). This sampling procedure is consistent with the EPA method as described in the document entitled *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air – Compendium Method TO-4A (high air volume); and Compendium Method TO-10A (low air volume), second edition, January 1999*. Samples were analyzed for PCBs by TO-10A/EPA Modified 680 in accordance with Con-Test SOP entitled Compendium Method TO-4A/TO-10A by ASE extraction (Method 3545) and Soxhlet Extraction (method 3540).

3.2 Risk Data Set

The data used for evaluating potential exposures and calculating site risk were based upon post-remedial PCB sampling conducted by Tighe & Bond from inside the Former Digester Building. Post remedial samples for the basement and first/ground level included:

Concrete Surfaces: Six hexane surface wipes samples (Wipe-01 to Wipe-06) from the concrete/CMU surface following sand blasting collected on March 5, 2014. Although wipe samples are not typically recognized for PCB analysis on porous surfaces, the samples were collected for human health risk characterization comparisons with regards to direct contact exposure standards established under 761.61(a.4.ii).

Indoor Air: Two 8-hour air samples, one from the basement level and a second from the first/ground floor level, collected on May 5, 2015.

3.3 Contaminants of Concern

Contaminants consist of PCBs which are associated with former paint which was located on porous walled surfaces inside the former Digester building. PCBs were found to be in the paint of most surfaces including the walls, interior wall of digester tank, the interior metal piping on both the basement and first floor/ground levels of the building. The paint from these surface were removed via fully-contained sandblasting during renovation/upgrades in October 2012. Based upon a review of all the site characterization data, total PCBs consist mainly of the Aroclor 1254. PCBs remain on various porous surfaces inside both levels of the interior of the building and in indoor air. PCBs levels are higher in the basement than on the first/ground floor level of the building.

Information on specific congener toxicity is very limited. Most toxicity testing has been done on specific commercial mixtures; however, PCB mixtures found in the environment

will differ in composition from the commercial mixtures because of partitioning, biotransformation, and bioaccumulation. The EPA treats all PCBs as being potentially hazardous based on results from some formulations. However, this can have large uncertainty for any given mixture situation. Because the health effects of environmental mixtures of PCBs are difficult to evaluate, most of the toxicological information on PCBs is known about seven types of PCB mixtures that were commercially produced. These seven kinds of PCB mixtures include 35% of all the PCBs commercially produced and 98% of PCBs sold in the United States since 1970. Some commercial PCB mixtures are known in the United States by their industrial trade name, Aroclor. For example, the name Aroclor 1254 means that the mixture contains approximately 54% chlorine by weight, as indicated by the second two digits in the name. Aroclor 1254 is the type of PCB present in the structural concrete and CMUs inside the WWTP Former Digester Building.

PCBs do not readily break down and therefore may remain for very long periods of time. PCBs can enter the air by evaporation from building materials. Chronic (long-term) exposure to some PCB formulations by inhalation in humans results in respiratory tract symptoms, gastrointestinal effects, mild liver effects, and effects on the skin and eyes such as chloracne, skin rashes, and eye irritation. Epidemiological studies indicate an association between dietary PCB exposures and developmental effects. Human studies provide inconclusive, yet suggestive, evidence of an association between PCBs exposure and cancer. Animal studies have reported an increase in liver tumors in rats and mice exposed orally to all tested PCB formulations. (EPA, 2014, URL: <http://www.epa.gov/ttnatw01/hlthef/polychlo.html>).

3.4 Exposure Assessment

3.4.1 Receptor and Exposure Assumptions

The only receptor of concern at the Site is a WWTP plant worker. This receptor is an adult male and/or female person ranging in age from 22 to approximately 50 years old. No children are present at the site or have access to the building. The building is an unoccupied structure but is part of an active WWTP. The current building use and operation is expected to be the same in the long-term future.

The Former Digester Building is accessed by trained WWTP workers only for the purpose of monitoring the anaerobic systems and control panel in the basement. The building is entered into by workers occasionally on an infrequent schedule for a very short duration of time (10 to 15 minutes per day). The building does not contain any office, seating area or work area. The system/control panel in the building is SCADA-enabled but is currently operated manually by a WWTP worker. In the future, the system will be monitored and controlled remotely via a SCADA system. Thus, a WWTP worker will not need to enter the building on a routine basis in the future.

A resident is not considered a potential receptor under future use conditions as the building and property is part of a municipal WWTP facility.

3.4.2 Exposure Pathways

Wall Surfaces (Direct Contact)

Currently, potential direct contact exposure could occur if a WWTP worker touched and/or would come into direct contact with the interior concrete and/or CMU walls in the basement and/or first/ground floor of the Former Digester Building. Potential exposures could occur via 1) dermal contact of the WWTP's hand with the PCB-impacted concrete and/or CMU and or 2) incidental ingestion of PCB-impacted dust (if present) via transfer from the hand to the mouth. However, workers typically checking the control panels will have limited contact with the walls and thus these exposures are low or unlikely to occur.

However in the future, the WWTP worker will not be required to enter the building to check the system control panel on any routine basis as the system will be remotely controlled via a SCADA system. Thus, potential direct contact exposures to PCB impacted surfaces is not expected to occur in the future.

Indoor Air (Inhalation)

Because PCBs are volatile and can be present in air, the potential for exposure to a WWTP worker could occur via breathing air inside the Former Digester Building as part of their current routine work activity. Indoor air sampling conducted on May 5, 2015 confirmed the presence of PCBs in air in both the basement and first/ground floor levels of the building and thus the inhalation pathway is considered "complete" under current use conditions. However, the Former Digester Building is thoroughly vented at a minimum rate of six air changes per hour for the entire volume of the building in order to prevent the accumulation of anaerobic gases. Additionally as previously mentioned, once the SCADA system is enabled, the control panel/system in the building will be operated remotely and the WWTP worker will not need to enter the building.

3.4.3 Exposure Frequency and Duration

WWTP workers include adult persons that have worked at the facility over a span of a few months to several years. Of the current employees, the longest work durations has been 20 years. Currently, a WWTP worker's exposure frequency and duration is very low. According to the WWTP facility manager, the building is entered infrequently by a worker to do a specific task. The WWTP worker's tasks is to adjust/regulate and or do basic quick check on the control panel/system located in the basement of the building. This work task is conducted on average once a month and takes approximately 10 to 15 minutes to conduct. Except for occasional routine system control checks, no one enters or needs to go into the building. The facility has approximately 5 different employees/workers who share or rotate in performing the system checks and therefore the same WWTP worker may not even go into or enter the building for several weeks or months. Occasionally, a worker may enter the first floor only to store a lawn mower or a snow blower.

3.3.4 Exposure Point Concentrations

Dermal Contact - Concrete/CMU Surfaces

PCBs samples in wipes were relatively similar on the first/ground level in all three sampled locations. In contrast, PCBs in wipe samples on the basement floor varied more in concentration and were one order of magnitude higher than on the first floor/ground level. Various statistics were calculated using the wipe sample data as follows.

EPCs – PCBs in Wipe Samples (ug/100-cm²)

Location	Higher of Hexane/DI-Water
No. of Samples	6
Whole Building (6 samples)	60.8 (Mean) 98.56 (95 UCL)
First/Ground Floor (3 samples)	70.5 (Max)
Basement (3 samples)	137 (Max)

To provide, a more conservative estimate of risk, the EPC for the dermal exposure route was calculated to be 98.56 mg/kg which was based upon the 95 percent Confidence Limit on the mean (95 UCL) statistic of the higher of the hexane/Di-Water data set (6 samples) from the whole building. The 95UCL was calculated using ProUCL version 5.0, software published by the EPA for risk characterization at CERCLA and RCRA sites. EPC calculations using ProUCL are included in Appendix E.

Indoor Air

The EPC in indoor air was based upon the PCB concentrations (homologs) measured on May 5, 2015 which were as follows:

EPCs – PCB Homologs in Air (ug/m³)

PUF sample Location	Total PCBs	Pentachlorobiphenyls (Aroclor 1254)	% Arcolor of Total PCB Concentration
Basement	4.2	2.3	55%
First/ground Floor	1.3	0.71	55%

Because the indoor air concentrations were different between floors, separate EPCs for PCBs in indoor air were based upon the Total PCB concentrations (ug/m³) to estimate potential inhalation risk for each level of the building. As shown above, 55% of the total PCBs in air consists of pentachlorobiphenyls (Aroclor 1254).

3.5 Dermal Risk Evaluation

The EPCs for porous surfaces (wipe data) was compared to the surface PCB cleanup standard for non-porous surfaces for low occupancy areas as regulated under TSCA 40 CFR 761.61(4ii) which is 100 ug/100 cm² of surface area. The EPCs for the concrete/CMU surfaces based upon the 95UCL (98.56 ug/100 cm²) is less than the EPA/TSCA cleanup low occupancy standard (which is established for non-porous surfaces). Although the EPA wipe standard was established for non-porous surfaces, the use of the data to evaluate risk associated with the parkour surface should be considered suitably analogous. Therefore, the potential exposure via direct contact should not be considered significant.

3.6 Inhalation Risk Evaluation

It is assumed for non-carcinogenic chemicals that a threshold or minimum exposure level exists at which no adverse health effects are expected to occur. This dose or threshold level is called a No Observed Adverse Effect Level (NOAEL). The lowest dose at which an adverse effect is observed is called the Lowest Observed Adverse Effect Level (LOAEL). EPA has derived acceptable maximum concentrations (for air), referred to as the Reference Concentrations (RfCs), by applying uncertainty and modifying factors (UFs and MFs) to a NOAEL or LOAEL developed from dose-response studies as follows:

$$\text{RfC} = \frac{\text{NOAEL or LOAEL}}{\text{UF and/or MF}}$$

Exposure Assumptions:

As described in Section 3.4, the WWTP receptor frequency of use and duration of time in the former Digester Building is very infrequent and of very short duration. For the purposes of evaluating potential inhalation risk, the Exposure Frequency (EF) was assumed to be 1 day per month or 12 days per years. The typical average Exposure Duration (ED) inside the building based upon the work task (to check the control panel/system) is approximately 10 minutes per day (0.17 hour per day). As a conservative measure, the exposure frequency (EF) was assumed to be 30 minutes per day, which was based upon an actual work duration of 15 minutes times a safety factor of 2. The Exposure Period (EP) for the WWTP worker is assumed to be approximately 25 years (chronic exposure). These exposure assumptions are reasonable, yet conservative.

Toxicity Data:

For non-cancer risks, the Reference Concentrations (RfCs) are used for inhalation exposure to contaminants that have entered the lung, and are expressed as micrograms of contaminant per cubic meter of air ($\mu\text{g}/\text{m}^3$). The RfCs are considered to be the maximum daily levels of exposure to a specific contaminant that will not result in adverse, permanent health effects. The chronic RfC were used to long-term exposures (25 years) for the WWTP worker. EPA has not established an RfCs for PCBs (Aroclor 1016 or 1254) for the inhalation pathway. Thus, Tighe & Bond used the Inhalation RfC of $2.0 \times 10^{-2} \mu\text{g}/\text{m}^3$ ($2.0 \times 10^{-5} \text{mg}/\text{m}^3$) used by the MassDEP. The MassDEP Inhalation RfC is a Chemical Health Effects Assessment Methodology and Method to derive Allowable Ambient Limits (CHEM/AAL). See <http://www.mass.gov/dep/toxics/stypes/telaala.htm>.

Dose-response data for carcinogens is provided in the form of a unit risk (UR) for lung inhalation exposure. The UR values are cancer potency factors and represent the relationship between the exposure of a carcinogen and the probability of developing cancer over a lifetime. A lower UR value indicates greater probability of developing cancer. The units for UR are $(\mu\text{g}/\text{m}^3)^{-1}$. PCBs are classified a Group B2, probable human carcinogen. The Unit Risk (UR) for PCBs for the inhalation pathway is 1.00×10^{-4} which is based upon EPA, IRIS, current as of May 2012.

Calculation of Inhalation Lifetime/Average Daily Exposure:

The first step of the risk characterization involved calculation of the average and lifetime daily dose (L)ADE for non-carcinogenic and carcinogenic health effects, respectively for PCBs. Inhalation exposures are estimated by average and lifetime daily exposures or (L)ADEs. The (L)ADDs and (L)ADEs were calculated for the inhalation of PCBs in indoor air

for both the basement and the first/ground floor of the building. The (L)ADE equations for non-cancer and cancer risk for the WWTP worker are provided in the calculation worksheets in Appendix F and are described below:

$$\begin{aligned} \text{Non-Cancer} \quad \text{ADE}_{\text{air}} (\text{ug}/\text{m}^3) &= \frac{\text{EPC}_{\text{air}} \times \text{EF} \times \text{ED} \times \text{EP} \times \text{C}}{\text{AP}} \\ \text{Cancer} \quad \text{LADE}_{\text{air}} (\text{ug}/\text{m}^3) &= \frac{\text{EPC}_{\text{air}} \times \text{EF} \times \text{ED} \times \text{EP} \times \text{C}}{\text{AP}_{\text{Lifetime}}} \end{aligned}$$

Where:

EPC = Exposure Concentration in air (ug/m³)

EF = Exposure Frequency (days/year) = 12 days per year (1x/month)

ED = Exposure Duration (hours/week) = 30 min/day = 0.5 hr/day

EP = Exposure Period (years) = 25 years (Chronic Exposure)

C = Conversion Factor (year/hr) = 0.00011408 years = 1 hour

AP = Averaging Period (years) = 25 years (same as EP for non-cancer)

AP = Averaging Period (years) = 70 years (EPA Lifetime)

Calculation of Inhalation Risk:

Non-cancer and cancer risk estimates were calculated for the inhalation pathway using the estimated LADDE as described above and by dividing by the RfC or multiplying by the URF as follows:

$$\begin{aligned} \text{Non-Cancer Risk (HI)} &= \text{ADE}_{\text{air}} / \text{RfC}_{\text{Inhalation}} \\ \text{Cancer Risk (ELCR)} &= \text{LADE} \times \text{Inhalation Unit Risk Factor} \end{aligned}$$

Where:

RfC_{Inhalation} = 2.0 x 10⁻² ug/m³ (MassDEP, 2013)

Inhalation Unit Risk Factor = 1.0 x 10⁻⁴ ug/m³ (EPA, IRIS, 2012)

If the HI is equal to or less than 1.0, then a potential non-cancer risk does not exist. The EPA non-cancer risk limit is 1.0. Cancer or non-threshold health effects are characterized by the Excess Lifetime Cancer Risk (ELCR) which is the estimate of the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the Site. The EPA acceptable risk limit of 1.0 x 10⁻⁶. If the ECLR is equal to or below the EPA cancer risk limits, then a potential increased cancer risk does not exist.

The calculated non-cancer and cancer risk estimates for the inhalation pathway were as follows:

Risk Summary – WWTP Worker Inhalation Pathway			
Location	EPC	Non-Cancer HI	Cancer Risk ELCR
Basement	4.2	0.14	1.0×10^{-7}
First/Ground Floor	1.3	0.04	3.2×10^{-8}
EPA Risk Limit		1.0	1.0×10^{-6}

As shown above, the cancer and non-cancer risk estimates for inhalation exposure were below the EPA risk limits in both the basement and the first floor of the Former Digester Building.

3.7 Risk Summary and Conclusion

Potential risk to a WWTP receptor was calculated for exposure to PCBs from dermal contact with concrete surfaces and inhalation of PCBs in indoor air. The risk evaluation indicated that:

- Under the current low occupancy area use scenario, the PCB concentrations on porous surface are below the EPA cleanup level for low occupancy areas of 100 ug/100-cm².
- Under the current use scenario, the inhalation risk evaluation indicated that a potential risk via inhalation of indoor air inside the former Digester Building does not exist for a WWTP worker.

Section 4

Remedial Alternatives Evaluation

Based upon the use and activities and use, the former Digester Building is currently a low occupancy area as defined in the TSCA regulations. Low occupancy is where annual occupancy for any individual not wearing dermal and respiratory protection is less than 840 hours (an average of 16.8 hours per week) for non-porous surfaces and less than 335 hours (an average of 6.7 hours per week) for *bulk PCB remediation waste*. The former Digester Building and the WWTP worker's activity in this structure meets this description because the structure is largely unoccupied and any occupancy that does occur is transitory. Additionally in the near future, the building and treatment system inside will be operated remotely via SCADA system.

As indicated on Figure 2, the extent of PCBs greater than 1 ppm inside the former Digester Building includes all walls in the basement and the first/ground floor of the structure. The results of the risk evaluation indicate that risk to a current WWTP worker is limited and therefore further remediation is not warranted.

Tighe & Bond's evaluated various remedial alternatives which included: 1) further sand blasting and/or scarification, 2) the use of epoxy coating and/or encapsulation of surfaces, 3) demolition and Construction of New Building, and 4) use of institutional controls. These alternatives were compared and evaluated with respect to various criteria including time, cost, effectiveness, feasibility, overall risk/benefit reduction and waste generation. A summary of this evaluation is presented below:

Alternative #1 - Sand Blasting and Scarification

This alternative was considered to be potentially effective to further reduce PCB concentration. Further sand blasting may result in the reduction of PCBs in concrete and CMU block however it is not expected that the concentration reduction will be significant. Sandblasting is not effective in removing a measurable thickness of surface materials.

Scarification of the walls using mechanical devices may be effective if thicknesses of greater than 1/2 to 1 inch could be achieved. However, impacts to the CMU blocks in this alternative are not advisable due to structural concerns and the fairly brittle nature of the blocks. If implemented, the total estimated cost for scarification of the basement concrete is approximately \$50,000. This alternative was not further considered.

Alternative #2 - Epoxy Coating and/or Encapsulation of Surfaces

Direct contact barriers are best used in higher occupancy setting to control potential risk (typically in higher occupancy settings) and are generally limited to epoxy coatings or constructing an interior barrier using non-porous materials. Due to limitations of epoxy coatings (long term operation and maintenance, life-cycle (average of 7 years), uncertain results with respect to ability to encapsulate PCBs), and humidity changes in this building, use of epoxy coatings are not considered appropriate in the former Digester Building and were not further considered.

Construction of an interior barrier using a variety of available construction materials and techniques may be considered feasible, however given the lack of any identified

risk to current WWTP worker, the installation of any direct contact surface barrier on the interior walls is not currently warranted. A direct contract barrier (thin gauge sheeting for example) would not be vapor tight and would not be effective in controlling PCBs in air.

If implemented, the total estimated cost for this alternative to install an interior covering on all walls is approximately \$35,000. This remedial alternative was not further considered.

Alternative #3 - Demolition and Construction of New Building.

This alternative would involve demolishing the existing former digester building and building an entirely new structure. The building is structurally in good condition and upgrades were made to the interior piping and tank system. The cost to demolish and rebuild the structure is estimated at greater than \$250,000. Given the lack of any identified risk to current WWTP worker and no change in future building or property use (WWTP facility), this alternative outweighs the risk reduction benefit and was not further considered.

Alternative #4 – Deed Notice and O&M Plan.

The only potential receptors at risk to PCBs include the current WWTP worker and future contractors that may be involved with the demolition of the structure. Recording of a deed notice to document the presence of PCBs and implementing an operation and maintenance plan would be effective in controlling current and future potential exposures. The cost to implement this alternative is considered reasonable.

Section 5

Summary and Certification

5.1 Summary

Based upon the risk assessment results, residual PCB concentrations in concrete/CMU block surfaces and indoor air within the former digester building do not pose a significant risk to human health (via direct contact or inhalation) based on current and/or future planned use (as a WWTP building).

5.2 Deed Notice

Because post-remedial PCBs in building materials do not meet the requirements for High Occupancy Areas under TSCA (less than 1 ppm), a notation on the deed to the property, is necessary to notify potential future owners of the conditions associated with this building. The deed notice will also summarize the O&M requirements summarized below. Pending EPA approval for this risk-based cleanup, a draft deed notice will be submitted to EPA for review and approval.

5.3 Future Operations and Maintenance

To limit the potential risk to WWTP personnel, best management practices (BMPs) will be used to avoid potential exposure to PCB impacted porous surfaces within the building. The BMPs would be established in an Operation and Maintenance (O&M) Plan, which would define requirements for; personnel protective equipment (PPE) required prior to impacting interior building walls (based on bulk sample results), the management of incidental wastes generated from the wall impacts (as a >50 ppm PCB remediation waste), future maintenance requirements and/or demolition of the building, notification procedures, required signage, and worker awareness training. As a BMP, Tighe & Bond recommends placing the "PCB ML" mark (per 40 CFR §761 .30(p)) in visible locations on the walled surface throughout the inside of the Digester Building. This visual signage/markings will help to prevent potential direct contact exposures. Pending EPA approval for risk-based cleanup, a written O&M Plan which provides additional details of the previously described BMPs, will be submitted to EPA review and approval.

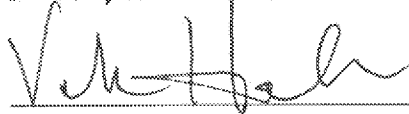
5.4 Certification

As required by 40 CFR § 761.61(a)(3)(i)(E), a written certification, signed by the owner of the property where the cleanup is located, that all sampling plans, sample collection procedures, sample preparation procedures, extraction procedures and instrumental/chemical analysis procedures used to assess or characterize the PCB contamination at the cleanup site, are on file and are available for EPA review with:

Vicki Halmen
Water & Wastewater Manager
Town of Ipswich
272 High Street
Ipswich, MA 01938
978-356-6635 ext. 2108

TOWN OF IPSWICH, MASSACHUSETTS

Signature:



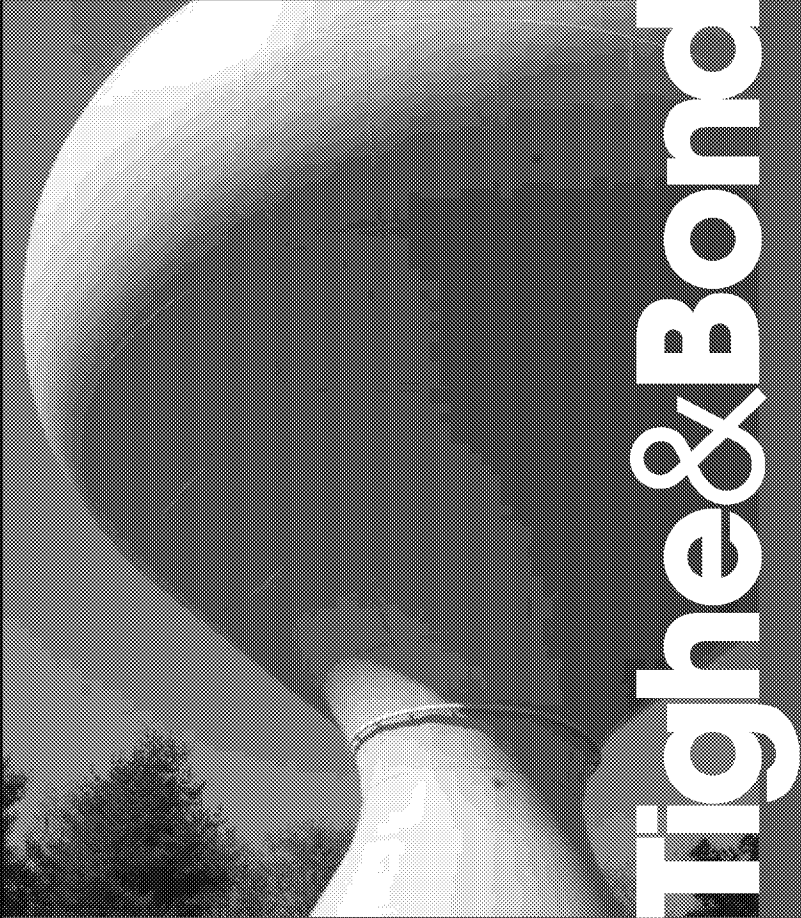
By:

VICKI HALMEN

Date:

2/29/16

J:\V\0066 Ipswich WWTP\03 - Indoor Air Sampling & Rev Cleanup Plan\Revised_Risk-Based Cleanup Plan\revised risk-based cleanup plan_FINAL DRAFT revised.docx





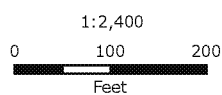
**FIGURE 1
AERIAL PHOTOGRAPH**

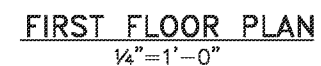
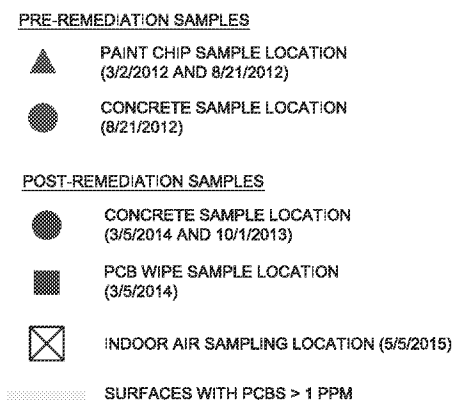
Waste Water Treatment Plant
Fowlers Lane
Ipswich, Massachusetts

August 2014



Based on MassGIS Color Orthophotography (April 2011-2012)





07/07

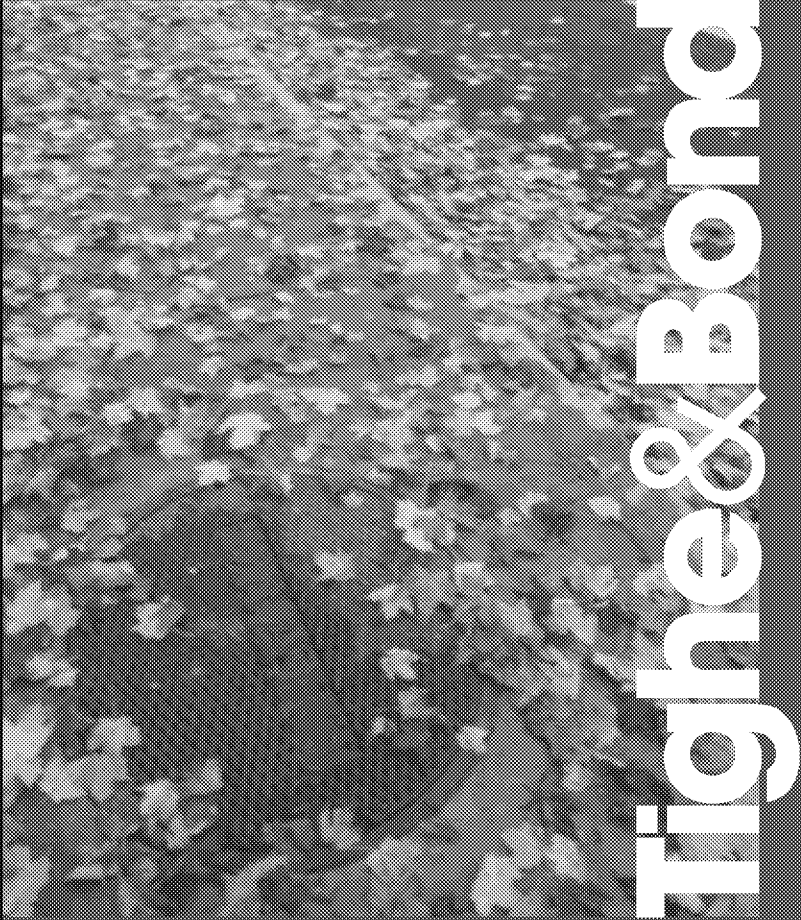


TABLE 1
PCB Sampling Locations - Paint Chip, Concrete and Wipe Samples (2012 - 2014)
WWTP Upgarde Project, Former Digester Building, Ipswich, MA

Paint Chip Samples (9 samples)

Arcolor 1254/Total PCBs

Sample ID	Sample Date	Location	Surface	Paint Color	Total PCB Concentration (mg/kg)
PCB-01	3/2/2012	Basement/1st Floor FMR Digester Bldg	Interior Piping	Brown	2,080
PCB-05	3/2/2012	Basement FMR Digester Bldg	All Sides	White	1,570
PCB-06	3/2/2012	Basement	Stairwell - Metal Railing	Green	350
P-01	8/21/2012	Basement	South Wall	Off-White	2,160
P-02	8/21/2012	Basement	West Wall	Off-White	7,270
P-03	8/21/2012	Basement/Digester Tank	North Wall	Off-White	2,870
P-04	8/21/2012	1st Floor /Ground	West Wall	Off-White	8,500
P-05	8/21/2012	1st Floor/Ground	East Wall	White	2,430

PCB-01 represents piping has been removed. New piping and systems were installed.

Concrete Substrate Samples (8 samples) - Pre-Sandblasting

Arcolor 1254/Total PCBs

Sample ID	Sample Date	Location	Side	Material	Total PCB Concentration (mg/kg)
CMU-01	8/21/2012	Basement - Infill (Removed)	South Wall	CMU Block	0.934
CMU-02	8/21/2012	Basement - Infill (Removed)	South Wall	CMU Block	164
C-01	8/21/2012	Basement	West Wall	Concrete	3.88
C-02	8/21/2012	Basement	East Wall	Concrete	11.4
C-03	8/21/2012	Basement	South Wall	Concrete	14.1
C-04	8/21/2012	Basement	Interior Column	Concrete	18
CMU-03	8/21/2012	1st Floor/Ground	Interior Wall	CMU Block	106
CMU-04	8/21/2012	1st Floor/Ground	West Wall	CMU Block	185

Concrete Substrate Samples (15 samples) - Post Sandblasting

Arcolor 1254/Total PCBs

Sample ID	Sample Date	Location	Side	Material	Total PCB Concentration (mg/kg)
Conc-01	10/1/2013	Basement	West Wall	Concrete	112
Conc-02	10/1/2013	Basement	West Wall	Concrete	67
Conc-03	10/1/2013	Basement	North (tank) Wall	Concrete	126
Conc-04	10/1/2013	Basement	East Wall	Concrete	71
Conc-05	10/1/2013	Basement	East Wall	Concrete	368
Conc-06	10/1/2013	Basement	South Wall	Concrete	477
Conc-07	10/1/2013	Basement	Interior Column	Concrete	29.1
Concrete-01	3/5/2014	Basement	West Wall	Concrete	1.1
Concrete-01A	3/5/2014	Basement	West Wall	Concrete	63.3
Concrete-02	3/5/2014	Basement	East Wall	Concrete	69.3
Concrete-02A	3/5/2014	Basement	East Wall	Concrete	70.2
CMU-08	10/1/2013	1st Floor/Ground	West Wall	CMU Block	321
CMU-09	10/1/2013	1st Floor/Ground	East Wall	CMU Block	320
CMU-10	10/12/2013	1st Floor/Ground	Interior Wall	CMU Block	518
CMU-11	10/1/2013	1st Floor/Ground	Interior Wall	CMU Block	556
CMU Block-01	3/5/2014	1st Floor/Ground	South Wall P-01/PCB-05	CMU Block	254
CMU Block-01A	3/5/2014	1st Floor/Ground	South Wall P-01/PCB-05	CMU Block	266
CMU-Block-02	3/5/2014	1st Floor/Ground	Interior Wall	CMU Block	219
CMU Block-02A	3/5/2014	1st Floor/Ground	Interior Wall	CMU Block	363

Concrete Wipe Samples (6 sample pairs Hexane and DI) - Post Sandblasting

Arcolor 1254/Total PCBs

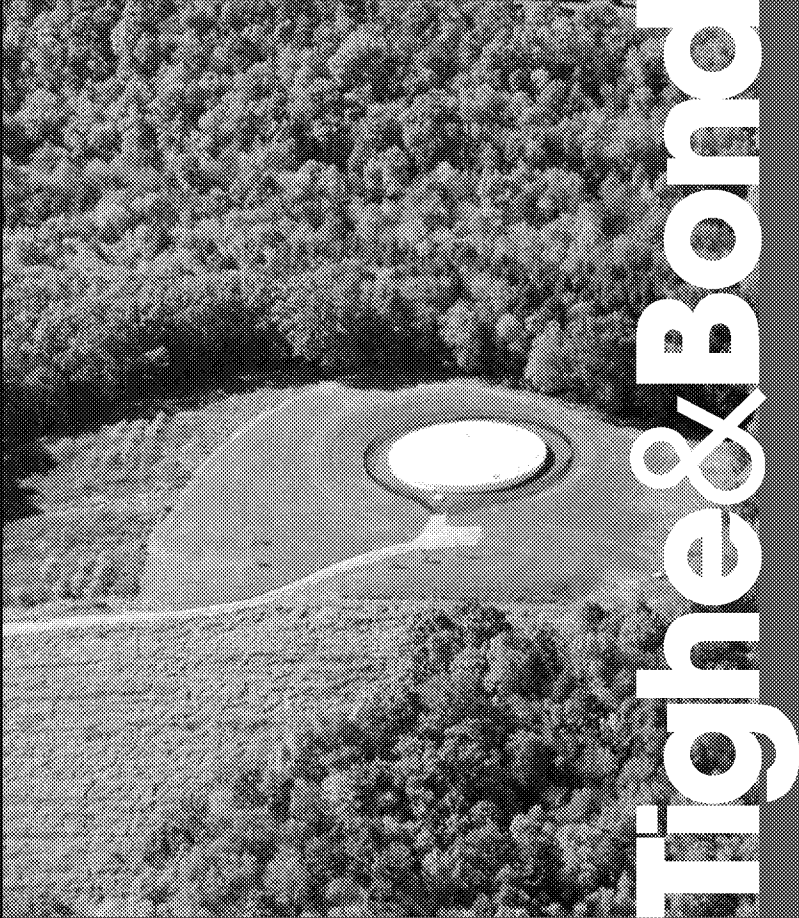
Sample ID	Sample Date	Location	Side	Total PCB- Concentration (Hexane) (ug/100 cm2)	Total PCB- Concentration (DI Water) (ug/100 cm2)
Wipe-01	3/5/2014	Basement	West Wall	137	131
Wipe-02	3/5/2014	Basement	East Wall	8.1	17.3
Wipe-03	3/5/2014	Basement	North (tank) Wall	4.8	9.2
Wipe-04	3/5/2014	1st Floor/Ground	West Wall	69.7	27.7
Wipe-05	3/5/2014	1st Floor/Ground	South Wall	61.1	33.7
Wipe-06	3/5/2014	1st Floor/Ground	Interior Wall	70.5	10.0

TABLE 2
Indoor Air Sampling Analytical Results - May 2015
WWTP Upgrade Project
Former Digester Building, Ipswich WWTP, Ipswich, MA

Parameter	SAMPLING LOCATION	
	Basement PUF	Floor 1 PUF
TO-10A/EPA 680 Modified		
Monochlorobiphenyls	<0.00083	<0.00083
Dichlorobiphenyls	0.034	0.006
Trichlorobiphenyls	0.21	0.042
Tetrachlorobiphenyls	1.1	0.34
Pentachlorobiphenyls	2.3	0.71
Hexachlorobiphenyls	0.45	0.16
Heptachlorobiphenyls	0.018	0.0064
Octachlorobiphenyls	<0.0025	<0.0025
Nonachlorobiphenyls	<0.0042	<0.0042
Decachlorobiphenyls	<0.0042	<0.0042
TOTAL PCBs (ug/m3)	4.2	1.3

NOTES:

ug/m3 = microgram per cubic meter





CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 01
Date Sampled: 10/01/13 10:20
Percent Solids: 97
Initial Volume: 10.4
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-01
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1221	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1232	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1242	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1248	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1254	112 (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1260	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1262	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1268	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 02
Date Sampled: 10/01/13 10:21
Percent Solids: 97
Initial Volume: 10
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-02
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1221	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1232	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1242	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1248	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1254	66.5 (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1260	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1262	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1268	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Cmu- 08
Date Sampled: 10/01/13 10:50
Percent Solids: 99
Initial Volume: 10.8
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-08
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1221	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1232	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1242	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1248	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1254	321 (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1260	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1262	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1268	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Cmu - 09
Date Sampled: 10/01/13 10:54
Percent Solids: 99
Initial Volume: 9.3
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-09
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1221	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1232	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1242	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1248	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1254	320 (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1260	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1262	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1268	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Jon VanHazinga
Tighe & Bond
446 Main Street
Worcester, MA 01608

RE: Ipswich WWTP (I0066)
ESS Laboratory Work Order Number: 1403085

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED

By ESS Laboratory at 11:08 am, Mar 14, 2014

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403085

SAMPLE RECEIPT

The following samples were received on March 07, 2014 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1403085-01	Concrete-01A	Solid	8082A
1403085-02	Concrete-02A	Solid	8082A
1403085-03	CMV Block-01A	Solid	8082A
1403085-04	CMV Block-02A	Solid	8082A



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403085

PROJECT NARRATIVE

8082 Polychlorinated Biphenyls (PCB) - 3540

1403085-01 **Surrogate recovery(ies) diluted below the MRL (SD).**
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1403085-02 **Surrogate recovery(ies) diluted below the MRL (SD).**
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1403085-03 **Surrogate recovery(ies) diluted below the MRL (SD).**
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1403085-04 **Surrogate recovery(ies) diluted below the MRL (SD).**
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

[Definitions of Quality Control Parameters](#)
[Semivolatile Organics Internal Standard Information](#)
[Semivolatile Organics Surrogate Information](#)
[Volatile Organics Internal Standard Information](#)
[Volatile Organics Surrogate Information](#)
[EPH and VPH Alkane Lists](#)



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403085

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Concrete-01A
Date Sampled: 03/05/14 15:12
Percent Solids: 97
Initial Volume: 10.5
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403085
ESS Laboratory Sample ID: 1403085-01
Sample Matrix: Solid
Units: mg/kg dry
Analyst: JXS
Prepared: 3/10/14 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (4.89)		8082A		50	03/12/14 22:59		CC41007
Aroclor 1221	ND (4.89)		8082A		50	03/12/14 22:59		CC41007
Aroclor 1232	ND (4.89)		8082A		50	03/12/14 22:59		CC41007
Aroclor 1242	ND (4.89)		8082A		50	03/12/14 22:59		CC41007
Aroclor 1248	ND (4.89)		8082A		50	03/12/14 22:59		CC41007
Aroclor 1254	63.3 (4.89)		8082A		50	03/12/14 22:59		CC41007
Aroclor 1260	ND (4.89)		8082A		50	03/12/14 22:59		CC41007
Aroclor 1262	ND (4.89)		8082A		50	03/12/14 22:59		CC41007
Aroclor 1268	ND (4.89)		8082A		50	03/12/14 22:59		CC41007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Concrete-02A
Date Sampled: 03/05/14 15:20
Percent Solids: 98
Initial Volume: 10.6
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403085
ESS Laboratory Sample ID: 1403085-02
Sample Matrix: Solid
Units: mg/kg dry
Analyst: JXS
Prepared: 3/10/14 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (4.83)		8082A		50	03/12/14 23:18		CC41007
Aroclor 1221	ND (4.83)		8082A		50	03/12/14 23:18		CC41007
Aroclor 1232	ND (4.83)		8082A		50	03/12/14 23:18		CC41007
Aroclor 1242	ND (4.83)		8082A		50	03/12/14 23:18		CC41007
Aroclor 1248	ND (4.83)		8082A		50	03/12/14 23:18		CC41007
Aroclor 1254	70.2 (4.83)		8082A		50	03/12/14 23:18		CC41007
Aroclor 1260	ND (4.83)		8082A		50	03/12/14 23:18		CC41007
Aroclor 1262	ND (4.83)		8082A		50	03/12/14 23:18		CC41007
Aroclor 1268	ND (4.83)		8082A		50	03/12/14 23:18		CC41007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: CMV Block-01A
Date Sampled: 03/05/14 15:35
Percent Solids: 99
Initial Volume: 10.5
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403085
ESS Laboratory Sample ID: 1403085-03
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 3/10/14 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (19.2)		8082A		200	03/13/14 14:32		CC41007
Aroclor 1221	ND (19.2)		8082A		200	03/13/14 14:32		CC41007
Aroclor 1232	ND (19.2)		8082A		200	03/13/14 14:32		CC41007
Aroclor 1242	ND (19.2)		8082A		200	03/13/14 14:32		CC41007
Aroclor 1248	ND (19.2)		8082A		200	03/13/14 14:32		CC41007
Aroclor 1254	266 (19.2)		8082A		200	03/13/14 14:32		CC41007
Aroclor 1260	ND (19.2)		8082A		200	03/13/14 14:32		CC41007
Aroclor 1262	ND (19.2)		8082A		200	03/13/14 14:32		CC41007
Aroclor 1268	ND (19.2)		8082A		200	03/13/14 14:32		CC41007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: CMV Block-02A
Date Sampled: 03/05/14 15:45
Percent Solids: 99
Initial Volume: 10.5
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403085
ESS Laboratory Sample ID: 1403085-04
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 3/10/14 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (19.2)		8082A		200	03/13/14 13:54		CC41007
Aroclor 1221	ND (19.2)		8082A		200	03/13/14 13:54		CC41007
Aroclor 1232	ND (19.2)		8082A		200	03/13/14 13:54		CC41007
Aroclor 1242	ND (19.2)		8082A		200	03/13/14 13:54		CC41007
Aroclor 1248	ND (19.2)		8082A		200	03/13/14 13:54		CC41007
Aroclor 1254	363 (19.2)		8082A		200	03/13/14 13:54		CC41007
Aroclor 1260	ND (19.2)		8082A		200	03/13/14 13:54		CC41007
Aroclor 1262	ND (19.2)		8082A		200	03/13/14 13:54		CC41007
Aroclor 1268	ND (19.2)		8082A		200	03/13/14 13:54		CC41007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403085

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CC41007 - 3540C

Blank

Aroclor 1016	ND	0.0500	mg/kg wet
Aroclor 1016 (1)	ND	0.0500	mg/kg wet
Aroclor 1016 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (2)	ND	0.0500	mg/kg wet
Aroclor 1016 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (3)	ND	0.0500	mg/kg wet
Aroclor 1016 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (4)	ND	0.0500	mg/kg wet
Aroclor 1016 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (5)	ND	0.0500	mg/kg wet
Aroclor 1016 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221	ND	0.0500	mg/kg wet
Aroclor 1221 (1)	ND	0.0500	mg/kg wet
Aroclor 1221 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (2)	ND	0.0500	mg/kg wet
Aroclor 1221 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (3)	ND	0.0500	mg/kg wet
Aroclor 1221 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (4)	ND	0.0500	mg/kg wet
Aroclor 1221 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (5)	ND	0.0500	mg/kg wet
Aroclor 1221 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232	ND	0.0500	mg/kg wet
Aroclor 1232 (1)	ND	0.0500	mg/kg wet
Aroclor 1232 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (2)	ND	0.0500	mg/kg wet
Aroclor 1232 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (3)	ND	0.0500	mg/kg wet
Aroclor 1232 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (4)	ND	0.0500	mg/kg wet
Aroclor 1232 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (5)	ND	0.0500	mg/kg wet
Aroclor 1232 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242	ND	0.0500	mg/kg wet
Aroclor 1242 (1)	ND	0.0500	mg/kg wet
Aroclor 1242 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (2)	ND	0.0500	mg/kg wet
Aroclor 1242 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (3)	ND	0.0500	mg/kg wet
Aroclor 1242 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (4)	ND	0.0500	mg/kg wet
Aroclor 1242 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (5)	ND	0.0500	mg/kg wet
Aroclor 1242 (5) [2C]	ND	0.0500	mg/kg wet



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403085

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CC41007 - 3540C

Aroclor 1248	ND	0.0500	mg/kg wet
Aroclor 1248 (1)	ND	0.0500	mg/kg wet
Aroclor 1248 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (2)	ND	0.0500	mg/kg wet
Aroclor 1248 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (3)	ND	0.0500	mg/kg wet
Aroclor 1248 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (4)	ND	0.0500	mg/kg wet
Aroclor 1248 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (5)	ND	0.0500	mg/kg wet
Aroclor 1248 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254	ND	0.0500	mg/kg wet
Aroclor 1254 (1)	ND	0.0500	mg/kg wet
Aroclor 1254 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (2)	ND	0.0500	mg/kg wet
Aroclor 1254 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (3)	ND	0.0500	mg/kg wet
Aroclor 1254 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (4)	ND	0.0500	mg/kg wet
Aroclor 1254 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (5)	ND	0.0500	mg/kg wet
Aroclor 1254 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260	ND	0.0500	mg/kg wet
Aroclor 1260 (1)	ND	0.0500	mg/kg wet
Aroclor 1260 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260 (2)	ND	0.0500	mg/kg wet
Aroclor 1260 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260 (3)	ND	0.0500	mg/kg wet
Aroclor 1260 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260 (4)	ND	0.0500	mg/kg wet
Aroclor 1260 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260 (5)	ND	0.0500	mg/kg wet
Aroclor 1260 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262	ND	0.0500	mg/kg wet
Aroclor 1262 (1)	ND	0.0500	mg/kg wet
Aroclor 1262 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262 (2)	ND	0.0500	mg/kg wet
Aroclor 1262 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262 (3)	ND	0.0500	mg/kg wet
Aroclor 1262 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262 (4)	ND	0.0500	mg/kg wet
Aroclor 1262 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262 (5)	ND	0.0500	mg/kg wet
Aroclor 1262 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1268	ND	0.0500	mg/kg wet



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403085

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CC41007 - 3540C

Aroclor 1268 (1)	ND	0.0500	mg/kg wet							
Aroclor 1268 (1) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (2)	ND	0.0500	mg/kg wet							
Aroclor 1268 (2) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (3)	ND	0.0500	mg/kg wet							
Aroclor 1268 (3) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (4)	ND	0.0500	mg/kg wet							
Aroclor 1268 (4) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (5)	ND	0.0500	mg/kg wet							
Aroclor 1268 (5) [2C]	ND	0.0500	mg/kg wet							

Surrogate: Decachlorobiphenyl	0.0252		mg/kg wet	0.02500		101	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0293		mg/kg wet	0.02500		117	30-150			
Surrogate: Tetrachloro-m-xylene	0.0210		mg/kg wet	0.02500		84	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0220		mg/kg wet	0.02500		88	30-150			

LCS

Aroclor 1016	0.484	0.0500	mg/kg wet	0.5000		97	40-140			
Aroclor 1260	0.505	0.0500	mg/kg wet	0.5000		101	40-140			

Surrogate: Decachlorobiphenyl	0.0261		mg/kg wet	0.02500		104	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0315		mg/kg wet	0.02500		126	30-150			
Surrogate: Tetrachloro-m-xylene	0.0234		mg/kg wet	0.02500		94	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0229		mg/kg wet	0.02500		92	30-150			

LCS Dup

Aroclor 1016	0.441	0.0500	mg/kg wet	0.5000		88	40-140	9	30	
Aroclor 1260	0.461	0.0500	mg/kg wet	0.5000		92	40-140	9	30	

Surrogate: Decachlorobiphenyl	0.0233		mg/kg wet	0.02500		93	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0275		mg/kg wet	0.02500		110	30-150			
Surrogate: Tetrachloro-m-xylene	0.0199		mg/kg wet	0.02500		79	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0196		mg/kg wet	0.02500		79	30-150			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403085

Notes and Definitions

U	Analyte included in the analysis, but not detected
SD	Surrogate recovery(ies) diluted below the MRL (SD).
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403085

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)

A2LA Accredited: Testing Cert# 2864.01

<http://www.a2la.org/scopepdf/2864-01.pdf>

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002

<http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls>

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.dep.state.ma.us/Labcert/Labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424

<http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006

http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01

Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)

<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141

Lead Paint, Lead in Children's Metals Jewelry

<http://www.cpsc.gov/cgi-bin/labapplist.aspx>

Sample and Cooler Receipt Checklist

Client: Tighe & Bond

Client Project ID: _____

Shipped/Delivered Via: ESS CourierESS Project ID: 14030085Date Project Due: 3/14/14Days For Project: 5 Day**Items to be checked upon receipt:**

1. Air Bill Manifest Present?

☒ No

Air No.:

2. Were Custody Seals Present?

☐ No

3. Were Custody Seals Intact?

☐ N/A

4. Is Radiation count < 100 CPM?

☐ Yes

5. Is a cooler present?

☐ YesCooler Temp: 0.7Iced With: Ice

6. Was COC included with samples?

☐ Yes

7. Was COC signed and dated by client?

☐ Yes

8. Does the COC match the sample

☐ Yes

9. Is COC complete and correct?

☐ Yes

10. Are the samples properly preserved?

☐ Yes

11. Proper sample containers used?

☐ Yes

12. Any air bubbles in the VOA vials?

☐ N/A

13. Holding times exceeded?

☐ No

14. Sufficient sample volumes?

☐ Yes

15. Any Subcontracting needed?

☐ No16. Are ESS labels on correct containers? ☒ Yes ☐ No17. Were samples received intact? ☒ Yes ☐ No

ESS Sample IDs: _____

Sub Lab: _____

Analysis: _____

TAT: _____

18. Was there need to call project manager to discuss status? If yes, please explain.

Who was called?: _____

By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	4 oz Soil Jar	1	NP
2	Yes	4 oz Soil Jar	1	NP
3	Yes	4 oz Soil Jar	1	NP
4	Yes	4 oz Soil Jar	1	NP

Completed By: [Signature]Date/Time: 3/17/14 1804Reviewed By: [Signature]Date/Time: 3/17/14 2130

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Page 1 of 1

Turn Time If faster than 5 days, prior approval by laboratory is required #	Other	Reporting Limits	ESS LAB PROJECT ID
MA RI CT NH NJ NY ME Other	MA RI CT NH NJ NY ME Other	Electronic Deliverable	1403085
MA-MCP	USACE	Format: Excel Access PDF Other	
Is this project for any of the following: Navy USACE Other TSCA			

Co. Name TIGHE & BOND	Project # I-0066	Project Name (20 Char or less) I-95/USACE WWTP	Write Required Analysis	
Contact Person Jon VanHorn	Address 441 MAIN ST	Zip 01608	PO#	
City WORCESTER	State MA	Fax #	Email Address jvanhorn@tandc.com	
Telephone # 508-754-2201	COMP	GRAB	MATRIX	Collection Time
ESS LAB Sample #	Date	3-5-2014	1512	X SD
1	3-5-2014	1512	X SD	CONCRETE - 01A
2	1520	X SD	CONCRETE - 02A	
3	1535	X SD	CMU BLOCK - 01A	
4	1545	X SD	CMU BLOCK - 02A	

Container Type: P-Poly G-Glass S-Sterile V-VOA	Marix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters
Cooler Present	Yes No
Seals Intact	Yes No NA
Cooler Temp	0.7 Ice Kit
Relinquished by: (Signature)	3/5/14 10:38
Relinquished by: (Signature)	3/7/14 10:45
Received by: (Signature)	3/7/14 11:00
Received by: (Signature)	3/7/14 11:00



CERTIFICATE OF ANALYSIS

Jon VanHazinga
Tighe & Bond
446 Main Street
Worcester, MA 01608

RE: Ipswich WWTP (I-0066)
ESS Laboratory Work Order Number: 1403083

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED

By ESS Laboratory at 2:11 pm, Mar 14, 2014

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

SAMPLE RECEIPT

The following samples were received on March 07, 2014 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1403083-01	Wipe-01	Wipe	8082
1403083-02	Wipe-01 DI	Wipe	8082
1403083-03	Wipe-02	Wipe	8082
1403083-04	Wipe-02 DI	Wipe	8082
1403083-05	Wipe-03	Wipe	8082
1403083-06	Wipe-03 DI	Wipe	8082
1403083-07	Wipe-04	Wipe	8082
1403083-08	Wipe-04 DI	Wipe	8082
1403083-09	Wipe-05	Wipe	8082
1403083-10	Wipe-05 DI	Wipe	8082
1403083-11	Wipe-06	Wipe	8082
1403083-12	Wipe-06 DI	Wipe	8082
1403083-13	Concrete-01	Solid	8082A
1403083-14	Concrete-02	Solid	8082A
1403083-15	CMV Block-01	Solid	8082A
1403083-16	CMV Block-02	Solid	8082A



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

PROJECT NARRATIVE

8082 Polychlorinated Biphenyls (PCB) - 3540

1403083-13 **Surrogate recovery(ies) diluted below the MRL (SD).**
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1403083-14 **Surrogate recovery(ies) diluted below the MRL (SD).**
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1403083-15 **Surrogate recovery(ies) diluted below the MRL (SD).**
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1403083-16 **Surrogate recovery(ies) diluted below the MRL (SD).**
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

[Definitions of Quality Control Parameters](#)
[Semivolatile Organics Internal Standard Information](#)
[Semivolatile Organics Surrogate Information](#)
[Volatile Organics Internal Standard Information](#)
[Volatile Organics Surrogate Information](#)
[EPH and VPH Alkane Lists](#)



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-01
Date Sampled: 03/05/14 13:50
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-01
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/7/14 17:56

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/10/14 12:23		CC40723
Aroclor 1221	ND (1.0)		8082		1	03/10/14 12:23		CC40723
Aroclor 1232	ND (1.0)		8082		1	03/10/14 12:23		CC40723
Aroclor 1242	ND (1.0)		8082		1	03/10/14 12:23		CC40723
Aroclor 1248	ND (1.0)		8082		1	03/10/14 12:23		CC40723
Aroclor 1254	137 (10.0)		8082		10	03/13/14 13:16		CC40723
Aroclor 1260	ND (1.0)		8082		1	03/10/14 12:23		CC40723
Aroclor 1262	ND (1.0)		8082		1	03/10/14 12:23		CC40723
Aroclor 1268	ND (1.0)		8082		1	03/10/14 12:23		CC40723

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	92 %		30-150
Surrogate: Decachlorobiphenyl [2C]	96 %		30-150
Surrogate: Tetrachloro-m-xylene	68 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	85 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-01 DI
Date Sampled: 03/05/14 13:52
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-02
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/7/14 17:56

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/10/14 12:42		CC40723
Aroclor 1221	ND (1.0)		8082		1	03/10/14 12:42		CC40723
Aroclor 1232	ND (1.0)		8082		1	03/10/14 12:42		CC40723
Aroclor 1242	ND (1.0)		8082		1	03/10/14 12:42		CC40723
Aroclor 1248	ND (1.0)		8082		1	03/10/14 12:42		CC40723
Aroclor 1254	131 (10.0)		8082		10	03/13/14 13:35		CC40723
Aroclor 1260	ND (1.0)		8082		1	03/10/14 12:42		CC40723
Aroclor 1262	ND (1.0)		8082		1	03/10/14 12:42		CC40723
Aroclor 1268	ND (1.0)		8082		1	03/10/14 12:42		CC40723

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	118 %		30-150
Surrogate: Decachlorobiphenyl [2C]	116 %		30-150
Surrogate: Tetrachloro-m-xylene	79 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	108 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-02
Date Sampled: 03/05/14 13:56
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-03
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/7/14 17:56

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/10/14 18:26		CC40723
Aroclor 1221	ND (1.0)		8082		1	03/10/14 18:26		CC40723
Aroclor 1232	ND (1.0)		8082		1	03/10/14 18:26		CC40723
Aroclor 1242	ND (1.0)		8082		1	03/10/14 18:26		CC40723
Aroclor 1248	ND (1.0)		8082		1	03/10/14 18:26		CC40723
Aroclor 1254	8.1 (1.0)		8082		1	03/10/14 18:26		CC40723
Aroclor 1260	ND (1.0)		8082		1	03/10/14 18:26		CC40723
Aroclor 1262	ND (1.0)		8082		1	03/10/14 18:26		CC40723
Aroclor 1268	ND (1.0)		8082		1	03/10/14 18:26		CC40723

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	84 %		30-150
Surrogate: Decachlorobiphenyl [2C]	84 %		30-150
Surrogate: Tetrachloro-m-xylene	76 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	94 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-02 DI
Date Sampled: 03/05/14 13:57
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-04
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/7/14 17:56

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/10/14 18:45		CC40723
Aroclor 1221	ND (1.0)		8082		1	03/10/14 18:45		CC40723
Aroclor 1232	ND (1.0)		8082		1	03/10/14 18:45		CC40723
Aroclor 1242	ND (1.0)		8082		1	03/10/14 18:45		CC40723
Aroclor 1248	ND (1.0)		8082		1	03/10/14 18:45		CC40723
Aroclor 1254	17.3 (1.0)		8082		1	03/10/14 18:45		CC40723
Aroclor 1260	ND (1.0)		8082		1	03/10/14 18:45		CC40723
Aroclor 1262	ND (1.0)		8082		1	03/10/14 18:45		CC40723
Aroclor 1268	ND (1.0)		8082		1	03/10/14 18:45		CC40723

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	96 %		30-150
Surrogate: Decachlorobiphenyl [2C]	100 %		30-150
Surrogate: Tetrachloro-m-xylene	81 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	109 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-03
Date Sampled: 03/05/14 14:00
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-05
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/10/14 18:00

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/12/14 13:21		CC41008
Aroclor 1221	ND (1.0)		8082		1	03/12/14 13:21		CC41008
Aroclor 1232	ND (1.0)		8082		1	03/12/14 13:21		CC41008
Aroclor 1242	ND (1.0)		8082		1	03/12/14 13:21		CC41008
Aroclor 1248	ND (1.0)		8082		1	03/12/14 13:21		CC41008
Aroclor 1254	4.8 (1.0)		8082		1	03/12/14 13:21		CC41008
Aroclor 1260	ND (1.0)		8082		1	03/12/14 13:21		CC41008
Aroclor 1262	ND (1.0)		8082		1	03/12/14 13:21		CC41008
Aroclor 1268	ND (1.0)		8082		1	03/12/14 13:21		CC41008

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	96 %		30-150
Surrogate: Decachlorobiphenyl [2C]	115 %		30-150
Surrogate: Tetrachloro-m-xylene	90 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	94 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-03 DI
Date Sampled: 03/05/14 14:02
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-06
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/10/14 18:00

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/12/14 13:40		CC41008
Aroclor 1221	ND (1.0)		8082		1	03/12/14 13:40		CC41008
Aroclor 1232	ND (1.0)		8082		1	03/12/14 13:40		CC41008
Aroclor 1242	ND (1.0)		8082		1	03/12/14 13:40		CC41008
Aroclor 1248	ND (1.0)		8082		1	03/12/14 13:40		CC41008
Aroclor 1254	9.2 (1.0)		8082		1	03/12/14 13:40		CC41008
Aroclor 1260	ND (1.0)		8082		1	03/12/14 13:40		CC41008
Aroclor 1262	ND (1.0)		8082		1	03/12/14 13:40		CC41008
Aroclor 1268	ND (1.0)		8082		1	03/12/14 13:40		CC41008

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	96 %		30-150
Surrogate: Decachlorobiphenyl [2C]	109 %		30-150
Surrogate: Tetrachloro-m-xylene	86 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	90 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-04
Date Sampled: 03/05/14 14:05
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-07
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/10/14 18:00

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/12/14 13:59		CC41008
Aroclor 1221	ND (1.0)		8082		1	03/12/14 13:59		CC41008
Aroclor 1232	ND (1.0)		8082		1	03/12/14 13:59		CC41008
Aroclor 1242	ND (1.0)		8082		1	03/12/14 13:59		CC41008
Aroclor 1248	ND (1.0)		8082		1	03/12/14 13:59		CC41008
Aroclor 1254	69.7 (5.0)		8082		5	03/13/14 14:13		CC41008
Aroclor 1260	ND (1.0)		8082		1	03/12/14 13:59		CC41008
Aroclor 1262	ND (1.0)		8082		1	03/12/14 13:59		CC41008
Aroclor 1268	ND (1.0)		8082		1	03/12/14 13:59		CC41008

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	100 %		30-150
Surrogate: Decachlorobiphenyl [2C]	113 %		30-150
Surrogate: Tetrachloro-m-xylene	42 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	45 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-04 DI
Date Sampled: 03/05/14 14:06
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-08
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/10/14 18:00

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/12/14 14:18		CC41008
Aroclor 1221	ND (1.0)		8082		1	03/12/14 14:18		CC41008
Aroclor 1232	ND (1.0)		8082		1	03/12/14 14:18		CC41008
Aroclor 1242	ND (1.0)		8082		1	03/12/14 14:18		CC41008
Aroclor 1248	ND (1.0)		8082		1	03/12/14 14:18		CC41008
Aroclor 1254	27.7 (5.0)		8082		5	03/13/14 14:50		CC41008
Aroclor 1260	ND (1.0)		8082		1	03/12/14 14:18		CC41008
Aroclor 1262	ND (1.0)		8082		1	03/12/14 14:18		CC41008
Aroclor 1268	ND (1.0)		8082		1	03/12/14 14:18		CC41008

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	102 %		30-150
Surrogate: Decachlorobiphenyl [2C]	114 %		30-150
Surrogate: Tetrachloro-m-xylene	89 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	93 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-05
Date Sampled: 03/05/14 14:10
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-09
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/10/14 18:00

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/12/14 14:37		CC41008
Aroclor 1221	ND (1.0)		8082		1	03/12/14 14:37		CC41008
Aroclor 1232	ND (1.0)		8082		1	03/12/14 14:37		CC41008
Aroclor 1242	ND (1.0)		8082		1	03/12/14 14:37		CC41008
Aroclor 1248	ND (1.0)		8082		1	03/12/14 14:37		CC41008
Aroclor 1254	61.1 (5.0)		8082		5	03/13/14 15:09		CC41008
Aroclor 1260	ND (1.0)		8082		1	03/12/14 14:37		CC41008
Aroclor 1262	ND (1.0)		8082		1	03/12/14 14:37		CC41008
Aroclor 1268	ND (1.0)		8082		1	03/12/14 14:37		CC41008

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	106 %		30-150
Surrogate: Decachlorobiphenyl [2C]	115 %		30-150
Surrogate: Tetrachloro-m-xylene	92 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	96 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-05 DI
Date Sampled: 03/05/14 14:11
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-10
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/10/14 18:00

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/12/14 14:56		CC41008
Aroclor 1221	ND (1.0)		8082		1	03/12/14 14:56		CC41008
Aroclor 1232	ND (1.0)		8082		1	03/12/14 14:56		CC41008
Aroclor 1242	ND (1.0)		8082		1	03/12/14 14:56		CC41008
Aroclor 1248	ND (1.0)		8082		1	03/12/14 14:56		CC41008
Aroclor 1254	33.7 (5.0)		8082		5	03/13/14 15:28		CC41008
Aroclor 1260	ND (1.0)		8082		1	03/12/14 14:56		CC41008
Aroclor 1262	ND (1.0)		8082		1	03/12/14 14:56		CC41008
Aroclor 1268	ND (1.0)		8082		1	03/12/14 14:56		CC41008

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	103 %		30-150
Surrogate: Decachlorobiphenyl [2C]	112 %		30-150
Surrogate: Tetrachloro-m-xylene	90 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	93 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-06
Date Sampled: 03/05/14 14:14
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-11
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/10/14 18:00

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/12/14 15:15		CC41008
Aroclor 1221	ND (1.0)		8082		1	03/12/14 15:15		CC41008
Aroclor 1232	ND (1.0)		8082		1	03/12/14 15:15		CC41008
Aroclor 1242	ND (1.0)		8082		1	03/12/14 15:15		CC41008
Aroclor 1248	ND (1.0)		8082		1	03/12/14 15:15		CC41008
Aroclor 1254	70.5 (10.0)		8082		10	03/13/14 15:47		CC41008
Aroclor 1260	ND (1.0)		8082		1	03/12/14 15:15		CC41008
Aroclor 1262	ND (1.0)		8082		1	03/12/14 15:15		CC41008
Aroclor 1268	ND (1.0)		8082		1	03/12/14 15:15		CC41008

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	103 %		30-150
Surrogate: Decachlorobiphenyl [2C]	114 %		30-150
Surrogate: Tetrachloro-m-xylene	87 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	91 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Wipe-06 DI
Date Sampled: 03/05/14 14:15
Percent Solids: N/A
Initial Volume: 1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-12
Sample Matrix: Wipe
Units: ug/Wipe
Analyst: TAJ
Prepared: 3/10/14 18:00

8082 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (1.0)		8082		1	03/12/14 15:34		CC41008
Aroclor 1221	ND (1.0)		8082		1	03/12/14 15:34		CC41008
Aroclor 1232	ND (1.0)		8082		1	03/12/14 15:34		CC41008
Aroclor 1242	ND (1.0)		8082		1	03/12/14 15:34		CC41008
Aroclor 1248	ND (1.0)		8082		1	03/12/14 15:34		CC41008
Aroclor 1254	10.0 (1.0)		8082		1	03/12/14 15:34		CC41008
Aroclor 1260	ND (1.0)		8082		1	03/12/14 15:34		CC41008
Aroclor 1262	ND (1.0)		8082		1	03/12/14 15:34		CC41008
Aroclor 1268	ND (1.0)		8082		1	03/12/14 15:34		CC41008

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	111 %		30-150
Surrogate: Decachlorobiphenyl [2C]	116 %		30-150
Surrogate: Tetrachloro-m-xylene	89 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	92 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Concrete-01
Date Sampled: 03/05/14 14:25
Percent Solids: 98
Initial Volume: 10.2
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-13
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 3/10/14 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.100)		8082A		1	03/13/14 16:06		CC41007
Aroclor 1221	ND (0.100)		8082A		1	03/13/14 16:06		CC41007
Aroclor 1232	ND (0.100)		8082A		1	03/13/14 16:06		CC41007
Aroclor 1242	ND (0.100)		8082A		1	03/13/14 16:06		CC41007
Aroclor 1248	ND (0.100)		8082A		1	03/13/14 16:06		CC41007
Aroclor 1254	1.14 (0.100)		8082A		1	03/13/14 16:06		CC41007
Aroclor 1260	ND (0.100)		8082A		1	03/13/14 16:06		CC41007
Aroclor 1262	ND (0.100)		8082A		1	03/13/14 16:06		CC41007
Aroclor 1268	ND (0.100)		8082A		1	03/13/14 16:06		CC41007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Concrete-02
Date Sampled: 03/05/14 14:35
Percent Solids: 97
Initial Volume: 10.2
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-14
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 3/10/14 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (5.03)		8082A		50	03/13/14 16:25		CC41007
Aroclor 1221	ND (5.03)		8082A		50	03/13/14 16:25		CC41007
Aroclor 1232	ND (5.03)		8082A		50	03/13/14 16:25		CC41007
Aroclor 1242	ND (5.03)		8082A		50	03/13/14 16:25		CC41007
Aroclor 1248	ND (5.03)		8082A		50	03/13/14 16:25		CC41007
Aroclor 1254	69.3 (5.03)		8082A		50	03/13/14 16:25		CC41007
Aroclor 1260	ND (5.03)		8082A		50	03/13/14 16:25		CC41007
Aroclor 1262	ND (5.03)		8082A		50	03/13/14 16:25		CC41007
Aroclor 1268	ND (5.03)		8082A		50	03/13/14 16:25		CC41007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: CMV Block-01
Date Sampled: 03/05/14 14:45
Percent Solids: 99
Initial Volume: 10.3
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-15
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 3/10/14 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (19.5)		8082A		200	03/13/14 16:44		CC41007
Aroclor 1221	ND (19.5)		8082A		200	03/13/14 16:44		CC41007
Aroclor 1232	ND (19.5)		8082A		200	03/13/14 16:44		CC41007
Aroclor 1242	ND (19.5)		8082A		200	03/13/14 16:44		CC41007
Aroclor 1248	ND (19.5)		8082A		200	03/13/14 16:44		CC41007
Aroclor 1254	254 (19.5)		8082A		200	03/13/14 16:44		CC41007
Aroclor 1260	ND (19.5)		8082A		200	03/13/14 16:44		CC41007
Aroclor 1262	ND (19.5)		8082A		200	03/13/14 16:44		CC41007
Aroclor 1268	ND (19.5)		8082A		200	03/13/14 16:44		CC41007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: CMV Block-02
Date Sampled: 03/05/14 14:57
Percent Solids: 100
Initial Volume: 10.4
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1403083
ESS Laboratory Sample ID: 1403083-16
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 3/10/14 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (19.2)		8082A		200	03/13/14 17:03		CC41007
Aroclor 1221	ND (19.2)		8082A		200	03/13/14 17:03		CC41007
Aroclor 1232	ND (19.2)		8082A		200	03/13/14 17:03		CC41007
Aroclor 1242	ND (19.2)		8082A		200	03/13/14 17:03		CC41007
Aroclor 1248	ND (19.2)		8082A		200	03/13/14 17:03		CC41007
Aroclor 1254	219 (19.2)		8082A		200	03/13/14 17:03		CC41007
Aroclor 1260	ND (19.2)		8082A		200	03/13/14 17:03		CC41007
Aroclor 1262	ND (19.2)		8082A		200	03/13/14 17:03		CC41007
Aroclor 1268	ND (19.2)		8082A		200	03/13/14 17:03		CC41007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB)

Batch CC40723 - 3540C

Blank

Aroclor 1016	ND	1.0	ug/Wipe
Aroclor 1221	ND	1.0	ug/Wipe
Aroclor 1232	ND	1.0	ug/Wipe
Aroclor 1242	ND	1.0	ug/Wipe
Aroclor 1248	ND	1.0	ug/Wipe
Aroclor 1254	ND	1.0	ug/Wipe
Aroclor 1260	ND	1.0	ug/Wipe
Aroclor 1262	ND	1.0	ug/Wipe
Aroclor 1268	ND	1.0	ug/Wipe

Surrogate: Decachlorobiphenyl	0.497		ug/Wipe	0.5000		99	30-150
Surrogate: Decachlorobiphenyl [2C]	0.561		ug/Wipe	0.5000		112	30-150
Surrogate: Tetrachloro-m-xylene	0.389		ug/Wipe	0.5000		78	30-150
Surrogate: Tetrachloro-m-xylene [2C]	0.486		ug/Wipe	0.5000		97	30-150

LCS

Aroclor 1016	10.4	1.0	ug/Wipe	10.00		104	40-140
Aroclor 1260	9.8	1.0	ug/Wipe	10.00		98	40-140
Surrogate: Decachlorobiphenyl	0.540		ug/Wipe	0.5000		108	30-150
Surrogate: Decachlorobiphenyl [2C]	0.583		ug/Wipe	0.5000		117	30-150
Surrogate: Tetrachloro-m-xylene	0.394		ug/Wipe	0.5000		79	30-150
Surrogate: Tetrachloro-m-xylene [2C]	0.501		ug/Wipe	0.5000		100	30-150

LCS Dup

Aroclor 1016	10.8	1.0	ug/Wipe	10.00		108	40-140	4	50
Aroclor 1260	10.1	1.0	ug/Wipe	10.00		101	40-140	2	50
Surrogate: Decachlorobiphenyl	0.541		ug/Wipe	0.5000		108	30-150		
Surrogate: Decachlorobiphenyl [2C]	0.598		ug/Wipe	0.5000		120	30-150		
Surrogate: Tetrachloro-m-xylene	0.414		ug/Wipe	0.5000		83	30-150		
Surrogate: Tetrachloro-m-xylene [2C]	0.528		ug/Wipe	0.5000		106	30-150		

Batch CC41008 - 3540C

Blank

Aroclor 1016	ND	1.0	ug/Wipe
Aroclor 1221	ND	1.0	ug/Wipe
Aroclor 1232	ND	1.0	ug/Wipe
Aroclor 1242	ND	1.0	ug/Wipe
Aroclor 1248	ND	1.0	ug/Wipe
Aroclor 1254	ND	1.0	ug/Wipe
Aroclor 1260	ND	1.0	ug/Wipe
Aroclor 1262	ND	1.0	ug/Wipe
Aroclor 1268	ND	1.0	ug/Wipe

Surrogate: Decachlorobiphenyl	0.505		ug/Wipe	0.5000		101	30-150
Surrogate: Decachlorobiphenyl [2C]	0.586		ug/Wipe	0.5000		117	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB)

Batch CC41008 - 3540C

Surrogate: Tetrachloro-m-xylene	0.419		ug/Wipe	0.5000		84	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.440		ug/Wipe	0.5000		88	30-150			

LCS

Aroclor 1016	9.7	1.0	ug/Wipe	10.00		97	40-140			
Aroclor 1260	10.1	1.0	ug/Wipe	10.00		101	40-140			

Surrogate: Decachlorobiphenyl	0.522		ug/Wipe	0.5000		104	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.629		ug/Wipe	0.5000		126	30-150			
Surrogate: Tetrachloro-m-xylene	0.469		ug/Wipe	0.5000		94	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.458		ug/Wipe	0.5000		92	30-150			

LCS Dup

Aroclor 1016	8.8	1.0	ug/Wipe	10.00		88	40-140	9	50	
Aroclor 1260	9.2	1.0	ug/Wipe	10.00		92	40-140	9	50	

Surrogate: Decachlorobiphenyl	0.465		ug/Wipe	0.5000		93	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.551		ug/Wipe	0.5000		110	30-150			
Surrogate: Tetrachloro-m-xylene	0.397		ug/Wipe	0.5000		79	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.393		ug/Wipe	0.5000		79	30-150			

8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CC41007 - 3540C

Blank

Aroclor 1016	ND	0.0500	mg/kg wet
Aroclor 1016 (1)	ND	0.0500	mg/kg wet
Aroclor 1016 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (2)	ND	0.0500	mg/kg wet
Aroclor 1016 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (3)	ND	0.0500	mg/kg wet
Aroclor 1016 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (4)	ND	0.0500	mg/kg wet
Aroclor 1016 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (5)	ND	0.0500	mg/kg wet
Aroclor 1016 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221	ND	0.0500	mg/kg wet
Aroclor 1221 (1)	ND	0.0500	mg/kg wet
Aroclor 1221 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (2)	ND	0.0500	mg/kg wet
Aroclor 1221 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (3)	ND	0.0500	mg/kg wet
Aroclor 1221 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (4)	ND	0.0500	mg/kg wet
Aroclor 1221 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (5)	ND	0.0500	mg/kg wet
Aroclor 1221 (5) [2C]	ND	0.0500	mg/kg wet



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CC41007 - 3540C

Aroclor 1232	ND	0.0500	mg/kg wet
Aroclor 1232 (1)	ND	0.0500	mg/kg wet
Aroclor 1232 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (2)	ND	0.0500	mg/kg wet
Aroclor 1232 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (3)	ND	0.0500	mg/kg wet
Aroclor 1232 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (4)	ND	0.0500	mg/kg wet
Aroclor 1232 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (5)	ND	0.0500	mg/kg wet
Aroclor 1232 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242	ND	0.0500	mg/kg wet
Aroclor 1242 (1)	ND	0.0500	mg/kg wet
Aroclor 1242 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (2)	ND	0.0500	mg/kg wet
Aroclor 1242 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (3)	ND	0.0500	mg/kg wet
Aroclor 1242 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (4)	ND	0.0500	mg/kg wet
Aroclor 1242 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (5)	ND	0.0500	mg/kg wet
Aroclor 1242 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248	ND	0.0500	mg/kg wet
Aroclor 1248 (1)	ND	0.0500	mg/kg wet
Aroclor 1248 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (2)	ND	0.0500	mg/kg wet
Aroclor 1248 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (3)	ND	0.0500	mg/kg wet
Aroclor 1248 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (4)	ND	0.0500	mg/kg wet
Aroclor 1248 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (5)	ND	0.0500	mg/kg wet
Aroclor 1248 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254	ND	0.0500	mg/kg wet
Aroclor 1254 (1)	ND	0.0500	mg/kg wet
Aroclor 1254 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (2)	ND	0.0500	mg/kg wet
Aroclor 1254 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (3)	ND	0.0500	mg/kg wet
Aroclor 1254 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (4)	ND	0.0500	mg/kg wet
Aroclor 1254 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (5)	ND	0.0500	mg/kg wet
Aroclor 1254 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260	ND	0.0500	mg/kg wet



CERTIFICATE OF ANALYSIS

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ESS Laboratory Work Order: 1403083

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CC41007 - 3540C

Aroclor 1260 (1)	ND	0.0500	mg/kg wet							
Aroclor 1260 (1) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1260 (2)	ND	0.0500	mg/kg wet							
Aroclor 1260 (2) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1260 (3)	ND	0.0500	mg/kg wet							
Aroclor 1260 (3) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1260 (4)	ND	0.0500	mg/kg wet							
Aroclor 1260 (4) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1260 (5)	ND	0.0500	mg/kg wet							
Aroclor 1260 (5) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1262	ND	0.0500	mg/kg wet							
Aroclor 1262 (1)	ND	0.0500	mg/kg wet							
Aroclor 1262 (1) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1262 (2)	ND	0.0500	mg/kg wet							
Aroclor 1262 (2) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1262 (3)	ND	0.0500	mg/kg wet							
Aroclor 1262 (3) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1262 (4)	ND	0.0500	mg/kg wet							
Aroclor 1262 (4) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1262 (5)	ND	0.0500	mg/kg wet							
Aroclor 1262 (5) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268	ND	0.0500	mg/kg wet							
Aroclor 1268 (1)	ND	0.0500	mg/kg wet							
Aroclor 1268 (1) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (2)	ND	0.0500	mg/kg wet							
Aroclor 1268 (2) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (3)	ND	0.0500	mg/kg wet							
Aroclor 1268 (3) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (4)	ND	0.0500	mg/kg wet							
Aroclor 1268 (4) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (5)	ND	0.0500	mg/kg wet							
Aroclor 1268 (5) [2C]	ND	0.0500	mg/kg wet							

Surrogate: Decachlorobiphenyl	0.0252		mg/kg wet	0.02500		101	30-150
Surrogate: Decachlorobiphenyl [2C]	0.0293		mg/kg wet	0.02500		117	30-150
Surrogate: Tetrachloro-m-xylene	0.0210		mg/kg wet	0.02500		84	30-150
Surrogate: Tetrachloro-m-xylene [2C]	0.0220		mg/kg wet	0.02500		88	30-150

LCS

Aroclor 1016	0.484	0.0500	mg/kg wet	0.5000		97	40-140
Aroclor 1260	0.505	0.0500	mg/kg wet	0.5000		101	40-140

Surrogate: Decachlorobiphenyl	0.0261		mg/kg wet	0.02500		104	30-150
Surrogate: Decachlorobiphenyl [2C]	0.0315		mg/kg wet	0.02500		126	30-150
Surrogate: Tetrachloro-m-xylene	0.0234		mg/kg wet	0.02500		94	30-150
Surrogate: Tetrachloro-m-xylene [2C]	0.0229		mg/kg wet	0.02500		92	30-150

LCS Dup



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CC41007 - 3540C

Aroclor 1016	0.441	0.0500	mg/kg wet	0.5000		88	40-140	9	30	
Aroclor 1260	0.461	0.0500	mg/kg wet	0.5000		92	40-140	9	30	
Surrogate: Decachlorobiphenyl	0.0233		mg/kg wet	0.02500		93	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0275		mg/kg wet	0.02500		110	30-150			
Surrogate: Tetrachloro-m-xylene	0.0199		mg/kg wet	0.02500		79	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0196		mg/kg wet	0.02500		79	30-150			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

Notes and Definitions

U	Analyte included in the analysis, but not detected
SD	Surrogate recovery(ies) diluted below the MRL (SD).
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1403083

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)

A2LA Accredited: Testing Cert# 2864.01

<http://www.a2la.org/scopepdf/2864-01.pdf>

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002

<http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls>

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.dep.state.ma.us/Labcert/Labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424

<http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006

http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01

Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)

<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141

Lead Paint, Lead in Children's Metals Jewelry

<http://www.cpsc.gov/cgi-bin/labapplist.aspx>

Sample and Cooler Receipt Checklist

Client: Tighe & Bond

Client Project ID: _____

Shipped/Delivered Via: ESS CourierESS Project ID: 14030083Date Project Due: 3/14/14Days For Project: 5 Day**Items to be checked upon receipt:**

1. Air Bill Manifest Present?

☐ * No

Air No.: _____

2. Were Custody Seals Present?

☐ No

3. Were Custody Seals Intact?

☐ N/A

4. Is Radiation count < 100 CPM?

☐ Yes

5. Is a cooler present?

☐ YesCooler Temp: 1.4Iced With: Ice

6. Was COC included with samples?

☐ Yes

7. Was COC signed and dated by client?

☐ Yes

8. Does the COC match the sample

☐ * No

9. Is COC complete and correct?

☐ * No

10. Are the samples properly preserved?

☐ Yes

11. Proper sample containers used?

☐ Yes

12. Any air bubbles in the VOA vials?

☐ N/A

13. Holding times exceeded?

☐ No

14. Sufficient sample volumes?

☐ Yes

15. Any Subcontracting needed?

☐ No16. Are ESS labels on correct containers? ☒ Yes ☐ No17. Were samples received intact? ☒ Yes ☐ No

ESS Sample IDs: _____

Sub Lab: _____

Analysis: _____

TAT: _____

18. Was there need to call project manager to discuss status? If yes, please explain.

jars mislabeled eo 3/10/14 no issues same sampleSample 1 and Sample 2 ID's on containersare switched. Container preserved with hexane is sample 1; DI = sample 2

Who was called?: _____

By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	2 oz Soil Jar	1	Hexane
2	Yes	2 oz Soil Jar	1	other
3	Yes	2 oz Soil Jar	1	Hexane
4	Yes	2 oz Soil Jar	1	other
5	Yes	2 oz Soil Jar	1	Hexane
6	Yes	2 oz Soil Jar	1	other
7	Yes	2 oz Soil Jar	1	Hexane
8	Yes	2 oz Soil Jar	1	other
9	Yes	2 oz Soil Jar	1	Hexane
10	Yes	2 oz Soil Jar	1	other
11	Yes	2 oz Soil Jar	1	Hexane
12	Yes	2 oz Soil Jar	1	other
13	Yes	4 oz Soil Jar	1	NP
14	Yes	4 oz Soil Jar	1	NP
15	Yes	4 oz Soil Jar	1	NP
16	Yes	4 oz Soil Jar	1	NP

Completed By: [Signature]Date/Time: 3/7/14 1736Reviewed By: [Signature]Date/Time: 3/7/14 1740

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Page 1 of 2

Turn Time If faster than 5 days, prior approval by laboratory is required #	Other	ESS LAB PROJECT ID
MA RI CT NH NJ NY ME Other	USACE Other <u>DTCA</u>	Reporting Limits <u>2.10 mg/cm²</u>
Is this project for any of the following: MA-MCP Navy	USACE Other <u>DTCA</u>	Electronic Deliverable Yes <u>No</u>
		Format: Excel <u>Access</u> PDF <u>X</u> Other

Co. Name <u>THIERSCH & BOND</u>	Project # <u>I-0066</u>	Project Name (20 Char. or less) <u>LEWIS WWT</u>	Write Required Analysis							
Contact Person <u>Jon VanHorn</u>	Address <u>446 MAIN ST</u>	PO#								
City <u>WORCESTER</u>	State <u>MA</u>	Zip <u>01008</u>								
Telephone # <u>508.754.2201</u>	Fax #	Email Address <u>jonvanhorn@thielschbond.com</u>								
ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	Write Required Analysis
1	3-5-2014	1350		X	W	WIPE-01	9	1	G	X
2		1352		X	W	WIPE-01 DI	10	1	G	X
3		1356		X	W	WIPE-02	9	1	G	X
4		1357		X	W	WIPE-02 DI	10	1	G	X
5		1400		X	W	WIPE-03	9	1	G	X
6		1402		X	W	WIPE-03 DI	10	1	G	X
7		1405		X	W	WIPE-04	9	1	G	X
8		1406		X	W	WIPE-04 DI	10	1	G	X
9		1410		X	W	WIPE-05	9	1	G	X
10		1411		X	W	WIPE-05 DI	10	1	G	X

Container Type: P-Poly G-Glass S-Sterile V-VOA Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters	
Cooler Present <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Internal Use Only <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Seals Intact <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	NA: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Cooler Temp: <u>1.4 ICE KH</u>	Comments: <u>See VanHorn</u>
Relinquished by: (Signature) <u>[Signature]</u> Date/Time <u>3/10/14 1038</u>	Relinquished by: (Signature) <u>[Signature]</u> Date/Time <u>3/14/14 1655</u>
Relinquished by: (Signature) <u>[Signature]</u> Date/Time <u>3/14/14 1038</u>	Relinquished by: (Signature) <u>[Signature]</u> Date/Time <u>3/14/14 1722</u>
Relinquished by: (Signature) <u>[Signature]</u> Date/Time <u>3/14/14 1038</u>	Relinquished by: (Signature) <u>[Signature]</u> Date/Time <u>3/14/14 1722</u>

in accordance with MADEP CAM VII A



CERTIFICATE OF ANALYSIS

Jon VanHazinga
Tighe & Bond
446 Main Street
Worcester, MA 01608

RE: Ipswich WWTP (I-66)
ESS Laboratory Work Order Number: 1310195

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED

By ESS Laboratory at 1:04 pm, Oct 17, 2013

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

SAMPLE RECEIPT

The following samples were received on October 09, 2013 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

For EPH soil samples, the aromatic range results have been corrected for identified cartridge contaminant in accordance with the CAM protocol.

Lab Number	SampleName	Matrix	Analysis
1310195-01	Conc - 01	Solid	8082A
1310195-02	Conc - 02	Solid	8082A
1310195-03	Conc - 03	Solid	8082A
1310195-04	Conc - 04	Solid	8082A
1310195-05	Conc - 05	Solid	8082A
1310195-06	Conc - 06	Solid	8082A
1310195-07	Conc - 07	Solid	8082A
1310195-08	Cmu- 08	Solid	8082A
1310195-09	Cmu - 09	Solid	8082A
1310195-10	Cmu - 10	Solid	8082A
1310195-11	Cmu - 11	Solid	8082A
1310195-12	Dup - 1	Solid	8082A



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

PROJECT NARRATIVE

8082 Polychlorinated Biphenyls (PCB) - 3540

1310195-01 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-02 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-03 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-04 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-05 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-06 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-07 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-08 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-09 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-10 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-11 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

1310195-12 Surrogate recovery(ies) diluted below the MRL (SD).
Decachlorobiphenyl (% @ 30-150%), Decachlorobiphenyl [2C] (% @ 30-150%), Tetrachloro-m-xylene (% @ 30-150%), Tetrachloro-m-xylene [2C] (% @ 30-150%)

No other observations noted.

End of Project Narrative.



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

DATA USABILITY LINKS

Definitions of Quality Control Parameters
Semivolatile Organics Internal Standard Information
Semivolatile Organics Surrogate Information
Volatile Organics Internal Standard Information
Volatile Organics Surrogate Information
EPH and VPH Alkane Lists

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5035 - Solid Purge and Trap



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1310195-01 through 1310195-12**

Matrices: ☐ Ground Water/Surface Water ☒ Soil/Sediment ☐ Drinking Water ☐ Air ☐ Other: _____

CAM Protocol (check all that apply below):

- | | | | | | |
|---|--|---|---|---|--|
| <input type="checkbox"/> 8260 VOC
CAM II A | <input type="checkbox"/> 7470/7471 Hg
CAM III B | <input type="checkbox"/> MassDEP VPH
CAM IV A | <input type="checkbox"/> 8081 Pesticides
CAM V B | <input type="checkbox"/> 7196 Hex Cr
CAM VI B | <input type="checkbox"/> MassDEP APH
CAM IX A |
| <input type="checkbox"/> 8270 SVOC
CAM II B | <input type="checkbox"/> 7010 Metals
CAM III C | <input type="checkbox"/> MassDEP EPH
CAM IV B | <input type="checkbox"/> 8151 Herbicides
CAM V C | <input type="checkbox"/> 8330 Explosives
CAM VIII A | <input type="checkbox"/> TO-15 VOC
CAM IX B |
| <input type="checkbox"/> 6010 Metals
CAM III A | <input type="checkbox"/> 6020 Metals
CAM III D | <input checked="" type="checkbox"/> 8082 PCB
CAM V A | <input type="checkbox"/> 6860 Perchlorate
CAM VIII B | <input type="checkbox"/> 9014 Total Cyanide/PAC
CAM VI A | |

Affirmative responses to questions A through F are required for Presumptive Certainty's status

- | | | |
|---|---|---|
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| D | Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| E | a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | b. APH and TO-15 Methods only: Was the complete analyte list reported for each method? | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |

Responses to Questions G, H and I below are required for Presumptive Certainty's status

- | | | |
|---|---|---|
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?
<i>Data User Note: Data that achieve Presumptive Certainty's status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40.1056 (2)(k) and WSC-07-350.</i> | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |

***All negative responses must be addressed in an attached laboratory narrative.**

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____
Printed Name: Laurel Stoddard

Date: October 17, 2013
Position: Laboratory Director



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 01
Date Sampled: 10/01/13 10:20
Percent Solids: 97
Initial Volume: 10.4
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-01
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1221	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1232	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1242	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1248	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1254	112 (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1260	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1262	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022
Aroclor 1268	ND (9.89)		8082A		100	10/11/13 19:41		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 02
Date Sampled: 10/01/13 10:21
Percent Solids: 97
Initial Volume: 10
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-02
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1221	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1232	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1242	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1248	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1254	66.5 (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1260	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1262	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022
Aroclor 1268	ND (5.14)		8082A		50	10/11/13 20:00		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 03
Date Sampled: 10/01/13 10:24
Percent Solids: 96
Initial Volume: 10.7
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-03
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (9.78)		8082A		100	10/11/13 20:19		CJ31022
Aroclor 1221	ND (9.78)		8082A		100	10/11/13 20:19		CJ31022
Aroclor 1232	ND (9.78)		8082A		100	10/11/13 20:19		CJ31022
Aroclor 1242	ND (9.78)		8082A		100	10/11/13 20:19		CJ31022
Aroclor 1248	ND (9.78)		8082A		100	10/11/13 20:19		CJ31022
Aroclor 1254	126 (9.78)		8082A		100	10/11/13 20:19		CJ31022
Aroclor 1260	ND (9.78)		8082A		100	10/11/13 20:19		CJ31022
Aroclor 1262	ND (9.78)		8082A		100	10/11/13 20:19		CJ31022
Aroclor 1268	ND (9.78)		8082A		100	10/11/13 20:19		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	%	SD	30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	%	SD	30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	%	SD	30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 04
Date Sampled: 10/01/13 10:27
Percent Solids: 98
Initial Volume: 9.1
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-04
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (5.61)		8082A		50	10/11/13 20:38		CJ31022
Aroclor 1221	ND (5.61)		8082A		50	10/11/13 20:38		CJ31022
Aroclor 1232	ND (5.61)		8082A		50	10/11/13 20:38		CJ31022
Aroclor 1242	ND (5.61)		8082A		50	10/11/13 20:38		CJ31022
Aroclor 1248	ND (5.61)		8082A		50	10/11/13 20:38		CJ31022
Aroclor 1254	71.0 (5.61)		8082A		50	10/11/13 20:38		CJ31022
Aroclor 1260	ND (5.61)		8082A		50	10/11/13 20:38		CJ31022
Aroclor 1262	ND (5.61)		8082A		50	10/11/13 20:38		CJ31022
Aroclor 1268	ND (5.61)		8082A		50	10/11/13 20:38		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 05
Date Sampled: 10/01/13 10:31
Percent Solids: 98
Initial Volume: 9.4
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-05
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (54.1)		8082A		500	10/11/13 20:57		CJ31022
Aroclor 1221	ND (54.1)		8082A		500	10/11/13 20:57		CJ31022
Aroclor 1232	ND (54.1)		8082A		500	10/11/13 20:57		CJ31022
Aroclor 1242	ND (54.1)		8082A		500	10/11/13 20:57		CJ31022
Aroclor 1248	ND (54.1)		8082A		500	10/11/13 20:57		CJ31022
Aroclor 1254	368 (54.1)		8082A		500	10/11/13 20:57		CJ31022
Aroclor 1260	ND (54.1)		8082A		500	10/11/13 20:57		CJ31022
Aroclor 1262	ND (54.1)		8082A		500	10/11/13 20:57		CJ31022
Aroclor 1268	ND (54.1)		8082A		500	10/11/13 20:57		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	%	SD	30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	%	SD	30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	%	SD	30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 06
Date Sampled: 10/01/13 10:35
Percent Solids: 98
Initial Volume: 10.7
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-06
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (47.8)		8082A		500	10/11/13 21:16		CJ31022
Aroclor 1221	ND (47.8)		8082A		500	10/11/13 21:16		CJ31022
Aroclor 1232	ND (47.8)		8082A		500	10/11/13 21:16		CJ31022
Aroclor 1242	ND (47.8)		8082A		500	10/11/13 21:16		CJ31022
Aroclor 1248	ND (47.8)		8082A		500	10/11/13 21:16		CJ31022
Aroclor 1254	477 (47.8)		8082A		500	10/11/13 21:16		CJ31022
Aroclor 1260	ND (47.8)		8082A		500	10/11/13 21:16		CJ31022
Aroclor 1262	ND (47.8)		8082A		500	10/11/13 21:16		CJ31022
Aroclor 1268	ND (47.8)		8082A		500	10/11/13 21:16		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Conc - 07
Date Sampled: 10/01/13 10:40
Percent Solids: 98
Initial Volume: 9.5
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-07
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (2.15)		8082A		20	10/11/13 21:35		CJ31022
Aroclor 1221	ND (2.15)		8082A		20	10/11/13 21:35		CJ31022
Aroclor 1232	ND (2.15)		8082A		20	10/11/13 21:35		CJ31022
Aroclor 1242	ND (2.15)		8082A		20	10/11/13 21:35		CJ31022
Aroclor 1248	ND (2.15)		8082A		20	10/11/13 21:35		CJ31022
Aroclor 1254	29.1 (2.15)		8082A		20	10/11/13 21:35		CJ31022
Aroclor 1260	ND (2.15)		8082A		20	10/11/13 21:35		CJ31022
Aroclor 1262	ND (2.15)		8082A		20	10/11/13 21:35		CJ31022
Aroclor 1268	ND (2.15)		8082A		20	10/11/13 21:35		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Cmu- 08
Date Sampled: 10/01/13 10:50
Percent Solids: 99
Initial Volume: 10.8
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-08
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1221	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1232	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1242	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1248	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1254	321 (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1260	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1262	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022
Aroclor 1268	ND (46.6)		8082A		500	10/11/13 21:54		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	%	SD	30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	%	SD	30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	%	SD	30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Cmu - 09
Date Sampled: 10/01/13 10:54
Percent Solids: 99
Initial Volume: 9.3
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-09
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1221	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1232	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1242	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1248	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1254	320 (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1260	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1262	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022
Aroclor 1268	ND (54.1)		8082A		500	10/11/13 22:13		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Cmu - 10
Date Sampled: 10/01/13 11:00
Percent Solids: 99
Initial Volume: 9.7
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-10
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (51.9)		8082A		500	10/11/13 22:31		CJ31022
Aroclor 1221	ND (51.9)		8082A		500	10/11/13 22:31		CJ31022
Aroclor 1232	ND (51.9)		8082A		500	10/11/13 22:31		CJ31022
Aroclor 1242	ND (51.9)		8082A		500	10/11/13 22:31		CJ31022
Aroclor 1248	ND (51.9)		8082A		500	10/11/13 22:31		CJ31022
Aroclor 1254	518 (51.9)		8082A		500	10/11/13 22:31		CJ31022
Aroclor 1260	ND (51.9)		8082A		500	10/11/13 22:31		CJ31022
Aroclor 1262	ND (51.9)		8082A		500	10/11/13 22:31		CJ31022
Aroclor 1268	ND (51.9)		8082A		500	10/11/13 22:31		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Cmu - 11
Date Sampled: 10/01/13 11:05
Percent Solids: 99
Initial Volume: 9.9
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-11
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (50.8)		8082A		500	10/11/13 22:50		CJ31022
Aroclor 1221	ND (50.8)		8082A		500	10/11/13 22:50		CJ31022
Aroclor 1232	ND (50.8)		8082A		500	10/11/13 22:50		CJ31022
Aroclor 1242	ND (50.8)		8082A		500	10/11/13 22:50		CJ31022
Aroclor 1248	ND (50.8)		8082A		500	10/11/13 22:50		CJ31022
Aroclor 1254	556 (50.8)		8082A		500	10/11/13 22:50		CJ31022
Aroclor 1260	ND (50.8)		8082A		500	10/11/13 22:50		CJ31022
Aroclor 1262	ND (50.8)		8082A		500	10/11/13 22:50		CJ31022
Aroclor 1268	ND (50.8)		8082A		500	10/11/13 22:50		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP
Client Sample ID: Dup - 1
Date Sampled: 10/01/13 10:22
Percent Solids: 97
Initial Volume: 9.6
Final Volume: 10
Extraction Method: 3540

ESS Laboratory Work Order: 1310195
ESS Laboratory Sample ID: 1310195-12
Sample Matrix: Solid
Units: mg/kg dry
Analyst: TAJ
Prepared: 10/10/13 18:00
Cleanup Method: 3665A

8082 Polychlorinated Biphenyls (PCB) - 3540

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (5.37)		8082A		50	10/11/13 23:09		CJ31022
Aroclor 1221	ND (5.37)		8082A		50	10/11/13 23:09		CJ31022
Aroclor 1232	ND (5.37)		8082A		50	10/11/13 23:09		CJ31022
Aroclor 1242	ND (5.37)		8082A		50	10/11/13 23:09		CJ31022
Aroclor 1248	ND (5.37)		8082A		50	10/11/13 23:09		CJ31022
Aroclor 1254	43.5 (5.37)		8082A		50	10/11/13 23:09		CJ31022
Aroclor 1260	ND (5.37)		8082A		50	10/11/13 23:09		CJ31022
Aroclor 1262	ND (5.37)		8082A		50	10/11/13 23:09		CJ31022
Aroclor 1268	ND (5.37)		8082A		50	10/11/13 23:09		CJ31022

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	%	SD	30-150
Surrogate: Decachlorobiphenyl [2C]	%	SD	30-150
Surrogate: Tetrachloro-m-xylene	%	SD	30-150
Surrogate: Tetrachloro-m-xylene [2C]	%	SD	30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CJ31022 - 3540

Blank

Aroclor 1016	ND	0.0500	mg/kg wet
Aroclor 1016 (1)	ND	0.0500	mg/kg wet
Aroclor 1016 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (2)	ND	0.0500	mg/kg wet
Aroclor 1016 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (3)	ND	0.0500	mg/kg wet
Aroclor 1016 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (4)	ND	0.0500	mg/kg wet
Aroclor 1016 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1016 (5)	ND	0.0500	mg/kg wet
Aroclor 1016 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221	ND	0.0500	mg/kg wet
Aroclor 1221 (1)	ND	0.0500	mg/kg wet
Aroclor 1221 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (2)	ND	0.0500	mg/kg wet
Aroclor 1221 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (3)	ND	0.0500	mg/kg wet
Aroclor 1221 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (4)	ND	0.0500	mg/kg wet
Aroclor 1221 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1221 (5)	ND	0.0500	mg/kg wet
Aroclor 1221 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232	ND	0.0500	mg/kg wet
Aroclor 1232 (1)	ND	0.0500	mg/kg wet
Aroclor 1232 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (2)	ND	0.0500	mg/kg wet
Aroclor 1232 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (3)	ND	0.0500	mg/kg wet
Aroclor 1232 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (4)	ND	0.0500	mg/kg wet
Aroclor 1232 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1232 (5)	ND	0.0500	mg/kg wet
Aroclor 1232 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242	ND	0.0500	mg/kg wet
Aroclor 1242 (1)	ND	0.0500	mg/kg wet
Aroclor 1242 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (2)	ND	0.0500	mg/kg wet
Aroclor 1242 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (3)	ND	0.0500	mg/kg wet
Aroclor 1242 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (4)	ND	0.0500	mg/kg wet
Aroclor 1242 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1242 (5)	ND	0.0500	mg/kg wet
Aroclor 1242 (5) [2C]	ND	0.0500	mg/kg wet



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CJ31022 - 3540

Aroclor 1248	ND	0.0500	mg/kg wet
Aroclor 1248 (1)	ND	0.0500	mg/kg wet
Aroclor 1248 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (2)	ND	0.0500	mg/kg wet
Aroclor 1248 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (3)	ND	0.0500	mg/kg wet
Aroclor 1248 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (4)	ND	0.0500	mg/kg wet
Aroclor 1248 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1248 (5)	ND	0.0500	mg/kg wet
Aroclor 1248 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254	ND	0.0500	mg/kg wet
Aroclor 1254 (1)	ND	0.0500	mg/kg wet
Aroclor 1254 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (2)	ND	0.0500	mg/kg wet
Aroclor 1254 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (3)	ND	0.0500	mg/kg wet
Aroclor 1254 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (4)	ND	0.0500	mg/kg wet
Aroclor 1254 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1254 (5)	ND	0.0500	mg/kg wet
Aroclor 1254 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260	ND	0.0500	mg/kg wet
Aroclor 1260 (1)	ND	0.0500	mg/kg wet
Aroclor 1260 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260 (2)	ND	0.0500	mg/kg wet
Aroclor 1260 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260 (3)	ND	0.0500	mg/kg wet
Aroclor 1260 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260 (4)	ND	0.0500	mg/kg wet
Aroclor 1260 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1260 (5)	ND	0.0500	mg/kg wet
Aroclor 1260 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262	ND	0.0500	mg/kg wet
Aroclor 1262 (1)	ND	0.0500	mg/kg wet
Aroclor 1262 (1) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262 (2)	ND	0.0500	mg/kg wet
Aroclor 1262 (2) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262 (3)	ND	0.0500	mg/kg wet
Aroclor 1262 (3) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262 (4)	ND	0.0500	mg/kg wet
Aroclor 1262 (4) [2C]	ND	0.0500	mg/kg wet
Aroclor 1262 (5)	ND	0.0500	mg/kg wet
Aroclor 1262 (5) [2C]	ND	0.0500	mg/kg wet
Aroclor 1268	ND	0.0500	mg/kg wet



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) - 3540

Batch CJ31022 - 3540

Aroclor 1268 (1)	ND	0.0500	mg/kg wet							
Aroclor 1268 (1) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (2)	ND	0.0500	mg/kg wet							
Aroclor 1268 (2) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (3)	ND	0.0500	mg/kg wet							
Aroclor 1268 (3) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (4)	ND	0.0500	mg/kg wet							
Aroclor 1268 (4) [2C]	ND	0.0500	mg/kg wet							
Aroclor 1268 (5)	ND	0.0500	mg/kg wet							
Aroclor 1268 (5) [2C]	ND	0.0500	mg/kg wet							

Surrogate: Decachlorobiphenyl	0.0254		mg/kg wet	0.02500		101	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0236		mg/kg wet	0.02500		94	30-150			
Surrogate: Tetrachloro-m-xylene	0.0211		mg/kg wet	0.02500		85	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0250		mg/kg wet	0.02500		100	30-150			

LCS

Aroclor 1016	0.464	0.0500	mg/kg wet	0.5000		93	40-140			
Aroclor 1260	0.482	0.0500	mg/kg wet	0.5000		96	40-140			

Surrogate: Decachlorobiphenyl	0.0260		mg/kg wet	0.02500		104	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0243		mg/kg wet	0.02500		97	30-150			
Surrogate: Tetrachloro-m-xylene	0.0195		mg/kg wet	0.02500		78	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0222		mg/kg wet	0.02500		89	30-150			

LCS Dup

Aroclor 1016	0.491	0.0500	mg/kg wet	0.5000		98	40-140	6	30	
Aroclor 1260	0.499	0.0500	mg/kg wet	0.5000		100	40-140	4	30	

Surrogate: Decachlorobiphenyl	0.0266		mg/kg wet	0.02500		106	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0247		mg/kg wet	0.02500		99	30-150			
Surrogate: Tetrachloro-m-xylene	0.0214		mg/kg wet	0.02500		86	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0242		mg/kg wet	0.02500		97	30-150			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

Notes and Definitions

U	Analyte included in the analysis, but not detected
SD	Surrogate recovery(ies) diluted below the MRL (SD).
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Ipswich WWTP

ESS Laboratory Work Order: 1310195

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)

A2LA Accredited: Testing Cert# 2864.01
<http://www.a2la.org/scopepdf/2864-01.pdf>

Rhode Island Potable and Non Potable Water: LAI00179
<http://www.health.ri.gov/labs/waterlabs-instate.php>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002
http://www.maine.gov/dep/blwq/topic/vessel/lab_list.pdf

Massachusetts Potable and Non Potable Water: M-RI002
<http://public.dep.state.ma.us/labcert/labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
<http://www4.egov.nh.gov/des/nhelap/namesearch.asp>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/dep/DEP_OPRA/

United States Department of Agriculture Soil Permit: S-54210

Maryland Potable Water: 301
http://www.mde.state.md.us/assets/document/WSP_labs-2009apr20.pdf

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
<http://www.cpsc.gov/cgi-bin/labapplist.aspx>

Sample and Cooler Receipt Checklist

Client: Tighe & Bond
Client Project ID: _____
Shipped/Delivered Via: ESS CourierESS Project ID: 13100195
Date Project Due: 10/16/13
Days For Project: 5 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present? ☐ * No
Air No.: _____
2. Were Custody Seals Present? ☐ No
3. Were Custody Seals Intact? ☐ N/A
4. Is Radiation count < 100 CPM? ☐ Yes
5. Is a cooler present? ☐ Yes
Cooler Temp: 1.2
Iced With: Ice
6. Was COC included with samples? ☐ Yes
7. Was COC signed and dated by client? ☐ Yes
8. Does the COC match the sample ☐ Yes
9. Is COC complete and correct? ☐ Yes
10. Are the samples properly preserved? ☐ Yes
11. Proper sample containers used? ☐ Yes
12. Any air bubbles in the VOA vials? ☐ N/A
13. Holding times exceeded? ☐ No
14. Sufficient sample volumes? ☐ Yes
15. Any Subcontracting needed? ☐ No
16. Are ESS labels on correct containers? ☒ Yes ☐ No
17. Were samples received intact? ☒ Yes ☐ No
- ESS Sample IDs: _____
- Sub Lab: _____
- Analysis: _____
- TAT: _____
18. Was there need to call project manager to discuss status? If yes, please explain.

Who was called?: _____

By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	2 oz Soil Jar	1	NP
2	Yes	2 oz Soil Jar	1	NP
3	Yes	2 oz Soil Jar	1	NP
4	Yes	2 oz Soil Jar	1	NP
5	Yes	2 oz Soil Jar	1	NP
6	Yes	2 oz Soil Jar	1	NP
7	Yes	2 oz Soil Jar	1	NP
8	Yes	2 oz Soil Jar	1	NP
9	Yes	2 oz Soil Jar	1	NP
10	Yes	2 oz Soil Jar	1	NP
11	Yes	2 oz Soil Jar	1	NP
12	Yes	2 oz Soil Jar	1	NP

Completed By: HOLDate/Time: 10/9/13 2320Reviewed By: Col J. J.Date/Time: 10/10/13 0947

ESS Laboratory
Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston, RI 02910-2211
 Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Page of 1

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CHAIN OF CUSTODY

Page 2 of 2Page 2 of 2


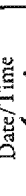
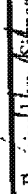





Turn Time _____	Standard _____	Other _____			
If faster than 5 days, prior approval by laboratory is required # _____					
State where samples were collected from:					
MA	RI	CT	NH	NJ	NY ME Other _____
Is this project for any of the following:					
MA MCB	USACE				Other _____
	Navv				
Reporting Limits L / ppm			ESS LAB PROJECT NO 130494		
Electronic Deliverable			Yes _____ No _____	PDF _____	Other _____
Format: Excel _____ Access _____					

[illegible][illegible]

C. I. 1. 10- β -D-Glucopyranosyl-L-Ascorbic Acid, 8-ZnAct, 9-

Sampled by:

Comments: Sample = Extra portion

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	12/19/13 10:25		12/19/13 10:25		12/19/13 10:25		12/19/13 10:25
	12/19/13 10:25		12/19/13 10:25		12/19/13 10:25		12/19/13 10:25

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 A

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A



ANALYTICAL REPORT

Lab Number:	L1216136
Client:	Tighe & Bond, Inc. 446 Main Street Worcester, MA 01608
ATTN:	Jonathan Van Hazinga
Phone:	(508) 754-2201
Project Name:	IPSWICH WWTP
Project Number:	I-0066
Report Date:	09/18/12

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAC00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1216136
Report Date: 09/18/12

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1216136-01	PCB-06	IPSWICH, MA	03/02/12 10:15

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1216136
Report Date: 09/18/12

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples free of charge for 30 days from the date the project is completed. After 30 days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1216136
Report Date: 09/18/12

Case Narrative (continued)

Sample Receipt

The analysis of PCBs was received with the method required holding time exceeded and was performed at the client's request.

PCBs

The surrogate recoveries for L1216136-01 are below the acceptance criteria for 2,4,5,6-Tetrachloro-m-xylene and Decachlorobiphenyl (All at 0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Elizabeth Simmons

Title: Technical Director/Representative

Date: 09/18/12

ORGANICS



PCBS



Project Name: IPSWICH WWTP

Lab Number: L1216136

Project Number: I-0066

Report Date: 09/18/12

SAMPLE RESULTS

Lab ID: L1216136-01 D
 Client ID: PCB-06
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 09/17/12 12:35
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 10:15
 Date Received: 09/11/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 09/13/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 09/14/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 09/14/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	29500	--	500
Aroclor 1221	ND		ug/kg	29500	--	500
Aroclor 1232	ND		ug/kg	29500	--	500
Aroclor 1242	ND		ug/kg	29500	--	500
Aroclor 1248	ND		ug/kg	19700	--	500
Aroclor 1254	350000		ug/kg	29500	--	500
Aroclor 1260	ND		ug/kg	19700	--	500
Aroclor 1262	ND		ug/kg	9840	--	500
Aroclor 1268	ND		ug/kg	9840	--	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1216136

Project Number: I-0066

Report Date: 09/18/12

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A
 Analytical Date: 09/14/12 14:16
 Analyst: KB

Extraction Method: EPA 3540C
 Extraction Date: 09/13/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 09/14/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 09/14/12

Parameter	Result	Qualifier	Units	RL	MDL
PCB by GC - Westborough Lab for sample(s): 01 Batch: WG560526-1					
Aroclor 1016	ND		ug/kg	56.4	--
Aroclor 1221	ND		ug/kg	56.4	--
Aroclor 1232	ND		ug/kg	56.4	--
Aroclor 1242	ND		ug/kg	56.4	--
Aroclor 1248	ND		ug/kg	37.6	--
Aroclor 1254	ND		ug/kg	56.4	--
Aroclor 1260	ND		ug/kg	37.6	--
Aroclor 1262	ND		ug/kg	18.8	--
Aroclor 1268	ND		ug/kg	18.8	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	92		30-150
Decachlorobiphenyl	89		30-150
2,4,5,6-Tetrachloro-m-xylene	94		30-150
Decachlorobiphenyl	96		30-150



Lab Control Sample Analysis

Batch Quality Control

Project Name: IPSWICH WWTP

Lab Number: L1216136

Project Number: I-0066

Report Date: 09/18/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB by GC - Westborough Lab Associated sample(s): 01 Batch: WG560526-2 WG560526-3								
Aroclor 1016	86		80		40-140	7		50
Aroclor 1260	85		81		40-140	5		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	97		90		30-150
Decachlorobiphenyl	92		89		30-150
2,4,5,6-Tetrachloro-m-xylene	98		91		30-150
Decachlorobiphenyl	110		100		30-150

Project Name: IPSWICH WWTP

Lab Number: L1216136

Project Number: I-0066

Report Date: 09/18/12

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information Custody Seal**Cooler**

A Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1216136-01A	Amber 250ml unpreserved	A	N/A	6	Y	Absent	PCB-8082LL-3540C(14)

*Values in parentheses indicate holding time in days



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1216136
Report Date: 09/18/12

GLOSSARY

Acronyms

EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than five times (5x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

Report Format: Data Usability Report



Project Name: IPSWICH WWTP**Lab Number:** L1216136**Project Number:** I-0066**Report Date:** 09/18/12**Data Qualifiers**

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1216136
Report Date: 09/18/12

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certificate/Approval Program Summary

Last revised August 16, 2012 - Westboro Facility

The following list includes only those analytes/methods for which certification/approval is currently held.
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

Connecticut Department of Public Health Certificate/Lab ID: PH-0574. NELAP Accredited Solid Waste/Soil.

Drinking Water (Inorganic Parameters: Color, pH, Turbidity, Conductivity, Alkalinity, Chloride, Free Residual Chlorine, Fluoride, Calcium Hardness, Sulfate, Nitrate, Nitrite, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Selenium, Silver, Sodium, Thallium, Zinc, Total Dissolved Solids, Total Organic Carbon, Total Cyanide, Perchlorate. Organic Parameters: Volatile Organics 524.2, Total Trihalomethanes 524.2, 1,2-Dibromo-3-chloropropane (DBCP) 504.1, Ethylene Dibromide (EDB) 504.1, 1,4-Dioxane (Mod 8270). Microbiology Parameters: Total Coliform-MF mEndo (SM9222B), Total Coliform – Colilert (SM9223, Enumeration and P/A), E. Coli. – Colilert (SM9223, Enumeration and P/A), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform-EC Medium (SM 9221E).

Wastewater/Non-Potable Water (Inorganic Parameters: Color, pH, Conductivity, Acidity, Alkalinity, Chloride, Total Residual Chlorine, Fluoride, Total Hardness, Silica, Sulfate, Sulfide, Ammonia, Kjeldahl Nitrogen, Nitrate, Nitrite, O-Phosphate, Total Phosphorus, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Dissolved Solids, Total Suspended Solids (non-filterable), BOD, CBOD, COD, TOC, Total Cyanide, Phenolics, Foaming Agents (MBAS), Bromide, Oil and Grease. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables (Phenols), Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, Polynuclear Aromatic Hydrocarbons, Haloethers, Chlorinated Hydrocarbons, Volatile Organics, TPH (HEM/SGT), CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH. Microbiology Parameters: Total Coliform – MF mEndo (SM9222B), Total Coliform – MTF (SM9221B), E. Coli – Colilert (SM9223 Enumeration), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform – A-1 Broth (SM9221E), Enterococcus - Enterolert.

Solid Waste/Soil (Inorganic Parameters: pH, Sulfide, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Tin, Vanadium, Zinc, Total Cyanide, Ignitability, Phenolics, Corrosivity, TCLP Leach (1311), SPLP Leach (1312 metals only), Reactivity. Organic Parameters: PCBs, PCBs in Oil, Organochlorine Pesticides, Technical Chlordane, Toxaphene, CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH, Dicamba, 2,4-D, 2,4,5-T, 2,4,5-TP (Silvex), Dalapon, Volatile Organics (SW 8260), Acid Extractables (Phenols) (SW 8270), Benzidines (SW 8270), Phthalates (SW 8270), Nitrosamines (SW 8270), Nitroaromatics & Cyclic Ketones (SW 8270), PAHs (SW 8270), Haloethers (SW 8270), Chlorinated Hydrocarbons (SW 8270).)

Maine Department of Human Services Certificate/Lab ID: 2009024.

Drinking Water (Inorganic Parameters: SM9215B, 9222D, 9223B, EPA 180.1, 353.2, SM2130B, 2320B, 2540C, 4500CI-D, 4500CN-C, 4500CN-E, 4500F-C, 4500H+B, 4500NO3-F, EPA 200.7, EPA 200.8, 245.1, EPA 300.0. Organic Parameters: 504.1, 524.2.)

Wastewater/Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664A, 350.1, 351.1, 353.2, 410.4, 420.1, SM2320B, 2510B, 2540C, 2540D, 426C, 4500CI-D, 4500CI-E, 4500CN-C, 4500CN-E, 4500F-B, 4500F-C, 4500H+B, 4500Norg-B, 4500Norg-C, 4500NH3-B, 4500NH3-G, 4500NO3-F, 4500P-B, 4500P-E, 5210B, 5220D, 5310C, 9010B, 9040B, 9030B, 7470A, 7196A, 2340B, EPA 200.7, 6010B, 200.8, 6020, 245.1, 1311, 1312, 3005A, Enterolert, 9223D, 9222D. Organic Parameters: 608, 624, 625, 8081A, 8082, 8330, 8151A, 8260B, 8270C, 3510C, 3630C, 5030B, ME-DRO, ME-GRO, MA-EPH, MA-VPH.)

Solid Waste/Soil (Inorganic Parameters: 9010B, 9012A, 9014A, 9030B, 9040B, 9045C, 6010B, 7471A, 7196A, 9050A, 1010, 1030, 9065, 1311, 1312, 3005A, 3050B. Organic Parameters: ME-DRO, ME-GRO, MA-EPH, MA-VPH, 8260B, 8270C, 8330, 8151A, 8081A, 8082, 3540C, 3546, 3580A, 3630C, 5030B, 5035.)

Massachusetts Department of Environmental Protection Certificate/Lab ID: M-MA086.

Drinking Water (Inorganic Parameters: (EPA 200.8 for: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl) (EPA 200.7 for: Ba,Be,Ca,Cd,Cr,Cu,Na,Ni) 245.1, (300.0 for: Nitrate-N, Fluoride, Sulfate); (EPA 353.2 for: Nitrate-N, Nitrite-N); (SM4500NO3-F for: Nitrate-N and Nitrite-N); 4500F-C, 4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, 2320B, SM2540C, SM4500H-B. Organic Parameters: (EPA 524.2 for: Trihalomethanes, Volatile Organics); (504.1 for: 1,2-Dibromoethane, 1,2-Dibromo-3-Chloropropane), EPA 332. Microbiology Parameters: SM9215B; ENZ. SUB. SM9223; ColilertQT SM9223B; MF-SM9222D.)

Non-Potable Water (Inorganic Parameters: (EPA 200.8 for: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn); (EPA 200.7

for: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn); 245.1, SM4500H,B, EPA 120.1, SM2510B, 2540C, 2340B, 2320B, 4500CL-E, 4500F-BC, 426C, SM4500NH3-BH, (EPA 350.1 for: Ammonia-N), LACHAT 10-107-06-1-B for Ammonia-N, SM4500NO3-F, 353.2 for Nitrate-N, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, 4500P-B,E, 5220D, EPA 410.4, SM 5210B, 5310C, 4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.

Organic Parameters: (EPA 624 for Volatile Halocarbons, Volatile Aromatics),(608 for: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT,Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs-Water), (EPA 625 for SVOC Acid Extractables and SVOC Base/Neutral Extractables), 600/4-81-045-PCB-Oil. Microbiology Parameters: (ColilertQT SM9223B; Enterolert-QT: SM9222D-MF.)

New Hampshire Department of Environmental Services Certificate/Lab ID: 200307. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM 9222B, 9223B, 9215B, EPA 200.7, 200.8, 300.0, SM4500CN-E, 4500H+B, 4500NO3-F, 2320B, 2510B, 2540C, 4500F-C, 5310C, 2120B, EPA 332.0. Organic Parameters: 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: SM9222D, 9221B, 9222B, 9221E-EC, EPA 3005A, 200.7, 200.8, 245.1, SW-846 6010B, 6010C, 6020, 6020A, 7196A, 7470A, SM3500-CR-D, EPA 120.1, 300.0, 350.1, 350.2, 351.1, 353.2, 410.4, 420.1, 426C, 1664A, SW-846 9010B, 9030B, 9040B, SM2120B, 2310B, 2320B, 2540B, 2540D, 4500H+B, 4500CL-E, 4500CN-E, 4500NH3-H, 4500NO3-F, 4500NO2-B, 4500P-E, 4500-S2-D, 5210B, 5220D, 2510B, 2540C, 4500F-C, 5310C, 5540C, LACHAT 10-204-00-1-A, LACHAT 10-107-06-2-D, 3060A. Organic Parameters: SW-846 3510C, 3630C, 5030B, 8260B, 8270C, 8270D, 8330, EPA 624, 625, 608, SW-846 8082, 8082A, 8081A, 8081B, 8151A, 8330, 8270C-SIM, 8270D-SIM.)

Solid & Chemical Materials (Inorganic Parameters: SW-846 6010B, 6010C, 7196A, 7471A, 1010, 1030, 9010, 9012A, 9014, 9030B, 9040B, 9045C, 9050, 9065,1311, 1312, 3005A, 3050B, 3060A. Organic Parameters: SW-846 3540C, 3546, 3050B, 3580A, 3630C, 5030B, 5035, 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, 8151A, 8015B, 8015C, 8082, 8082A, 8081A, 8081B.)

New Jersey Department of Environmental Protection Certificate/Lab ID: MA935. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM9222B, 9221E, 9223B, 9215B, 4500CN-CE, 4500NO3-F, 4500F-C, EPA 300.0, 200.7, 200.8, 245.1, 2540C, SM2120B, 2320B, 2510B, 5310C, SM4500H-B. Organic Parameters: EPA 332, 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: SM5210B, EPA 410.4, SM5220D, 4500CI-E, EPA 300.0, SM2120B, 2340B, SM4500F-BC, EPA 200.7, 200.8, 351.1, LACHAT 10-107-06-2-D, EPA 353.2, SM4500NO3-F, 4500NO2-B, EPA 1664A, SM5310B, C or D, 4500-PE, EPA 420.1, SM510ABC, SM4500P-B5+E, 2540B, 2540C, 2540D, 2540G, EPA 120.1, SM2510B, SM2520B, SM15 426C, 9222D, 9221B, 9221C, 9221E, 9222B, 9215B, 2310B, 2320B, 4500NH3-H, 4500-S D, EPA 350.1, 350.2, SW-846 1312, 7470A, 5540C, SM4500H-B, 4500SO3-B, SM3500Cr-D, 4500CN-CE, EPA 245.1, SW-846 9040B, 3005A, 3015, EPA 6010B, 6010C, 6020, 6020A, 7196A, 3060A, SW-846 9010B, 9030B. Organic Parameters: SW-846 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3510C, EPA 608, 624, 625, SW-846 3630C, 5030B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 1,4-Dioxane by NJ Modified 8270, 8015B, NJ EPH.)

Solid & Chemical Materials (Inorganic Parameters: SW-846, 6010B, 6010C, 6020, 6020A, 7196A, 3060A, 9010B, 9030B, 1010, 1030, 1311, 1312, 3005A, 3050B, 7471A, 7471B, 9014, 9012A, 9040B, 9040C, 9045C, 9045D, 9050A, 9065, 9251. Organic Parameters: SW-846 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3540C, 3546, 3580A, 3630C, 5030B, 5035L, 5035H, NJ OQA-QAM-025 Rev.7, NJ EPH.)

New York Department of Health Certificate/Lab ID: 11148. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM9223B, 9222B, 9215B, EPA 200.8, 200.7, 245.2, SM5310C, EPA 332.0, SM2320B, EPA 300.0, SM2120B, 4500CN-E, 4500F-C, 4500NO3-F, 2540C, SM 2510B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: SM9221E, 9222D, 9221B, 9222B, 9215B, 5210B, 5310C, EPA 410.4, SM5220D, 2310B-4a, 2320B, EPA 200.7, 300.0, SM4500CL-E, 4500F-C, SM15 426C, EPA 350.1, SM4500NH3-BH, EPA 351.1, LACHAT 10-107-06-2, EPA 353.2, SM4500-NO3-F, 4500-NO2-B, 4500P-E, 2540C, 2540B, 2540D, EPA 200.8, EPA 6010B, 6010C, 6020, 6020A, EPA 7196A, SM3500Cr-D, EPA 245.1, 245.2, 7470A, SM2120B, LACHAT 10-204-00-1-A, 4500CN-CE, EPA 1664A, EPA 420.1, SM14 510C, EPA 120.1, SM2510B, SM4500S-D, SM5540C, EPA 3005A, 3015, 9010B, 9030B. Organic Parameters: EPA 624, 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 625, 608, 8081A, 8081B, 8151A, 8330, 8082, 8082A, EPA 3510C, 5030B.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010, 1030, EPA 6010B, 6010C, 7196A, 7471A, 7471B, 9012A, 9014, 9065, 9050A, EPA 1311, 1312, 3005A, 3050B, 9010B, 9040C, 9045D. Organic Parameters: EPA 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8015B, 8015C, 8081A, 8081B, 8151A, 8330, 8082 8082A, 3540C, 3546, 3580, 3580A, 5030B, 5035A-H, 5035A-L.)

North Carolina Department of the Environment and Natural Resources Certificate/Lab ID : 666. (Inorganic Parameters: SM2310B, 2320B, 4500Cl-E, 4500Cn-E, 9014, Lachat 10-204-00-1-X, 1010A, 1030, 4500NO3-F, 353.2, 4500P-E, 4500SO4-E, 300.0, 4500S-D, 5310B, 5310C, 6010C, 6020A, 200.7, 200.8, 3500Cr-B, 7196A, 245.1, 7471A, 7471B, 1311, 1312. Organic Parameters: 608, 8081B, 8082A, 624, 8260B, 625, 8270D, 8151A, 8015C, 504.1, MA-EPH, MA-VPH.)

Drinking Water Program Certificate/Lab ID: 25700. (Inorganic Parameters: Chloride EPA 300.0. Organic Parameters: 524.2)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-03671. NELAP Accredited.
Drinking Water (Inorganic Parameters: 200.7, 200.8, 245.2, 300.0, 332.0, 2120B, 2320B, 2510B, 2540C, 4500-CN-CE, 4500F-C, 4500H+-B, 4500NO3-F, 5310C. Organic Parameters: EPA 524.2, 504.1)

Non-Potable Water (Inorganic Parameters: EPA 120.1, 1312, 3005A, 3015, 3060A, 200.7, 200.8, 410.4, 1664A, SM2540D, 5210B, 5220D, 4500-P, BE, 245.1, 300.0, 3501., 350.2, 353.2, 420.1, 6010B, 6010C, 6020, 6020A, 7196A, 7470A, 9010B, 9030B, 9040B, Lachat 10-107-06-2-D, NJ-EPH, 2120B, 2310B, 2320B, 2340B, 2510C, 2540B, 2540C, 3500Cr-D, 436C, 4500CN-CE, 4500Cl-E, 4500F-B, 4500F-C, 4500H+-B, 4500NO2-B, 4500NO3-F, 4500S-D, 4500SO3-B, 5310BCD, 5540C. Organic Parameters: EPA 3510C, 3630C, 5030B, 625, 624, 608, 8081A, 8081B, 8082, 8082A, 8151A, 8260B, 8270C, 8270D, 8330, 8015B,)

Solid & Hazardous Waste (Inorganic Parameters: EPA 350.1, 1010, 1030, 1311, 1312, 3005A, 3050B, 3060A, 6010B, 6010C, 6020A, 7196A, 7471A, 7471B, 9010B, 9012A, 9014, 9040B, 9045C, 9050, 9065, SM 4500NH3-BH, 9030B, 9038, 9251. Organic Parameters: 3540C, 3546, 3580A, 3630C, 5035, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, NJ-EPH.)

Rhode Island Department of Health Certificate/Lab ID: LAO00065. NELAP Accredited via NJ-DEP.

Refer to MA-DEP Certificate for Potable and Non-Potable Water.

Refer to NJ-DEP Certificate for Potable and Non-Potable Water.

Texas Commission on Environmental Quality Certificate/Lab ID: T104704476-09-1. NELAP Accredited.

Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664, 200.7, 200.8, 245.1, 245.2, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1, 6010, 6020, 7196, 7470, 9040, SM 2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 426C, 4500CL-E, 4500CN-E, 4500F-C, 4500H+-B, 4500NH3-H, 4500NO2B, 4500P-E, 4500 S²⁻D, 510C, 5210B, 5220D, 5310C, 5540C. Organic Parameters: EPA 608, 624, 625, 8081, 8082, 8151, 8260, 8270, 8330.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 1312, 9012, 9014, 9040, 9045, 9050, 9065.)

Virginia Division of Consolidated Laboratory Services Certificate/Lab ID: 460195. NELAP Accredited.

Drinking Water (Inorganic Parameters: EPA 200.7, 200.8, 300.0, 2510B, 2120B, 2540C, 4500CN-CE, 245.2, 2320B, 4500F-C, 4500F-C, 4500NO3-F, 5310C. Organic Parameters: EPA 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664A, 200.7, 200.8, 245.1, 300.0, 3005A, 3015, 1312, 6010B, 6010C, 3060A, 353.2, 420.1, 6020, 6020A, SM4500S-D, SM4500-CN-CE, Lachat 10-204-00-1-X, 7196A, 7470A, 9010B, 9040B, 2310B, 2320B, 2510B, 2540B, 2540C, 3500Cr-D, 426C, 4500Cl-E, 4500F-B, 4500F-C, 4500PE, 510AC, 5210B, 5310B 5310C, 5540C. Organic Parameters: EPA 3510C, 3630C, 5030B, 8260B, 608, 624, 625, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330,)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010A, 1030, 3060A, 3050B, 1311, 1312, 6010B, 6010C, 6020, , 7196A, 7471A, 7471B, 6020A, 9030B, 9010B, 9012A, 9014 9040B, 9045C, 9050A, 9065. Organic Parameters: EPA 5035, 3540C, 3546, 3550, 3580, 3630C, 8260B, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330.)

Department of Defense, L-A-B Certificate/Lab ID: L2217.

Drinking Water (Inorganic Parameters: SM 4500H-B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: EPA 200.7, 200.8, 6010B, 6010C, 6020, 6020A, 245.1, 245.2, 7470A, 9040B, 9010B, 180.1, 300.0, 332.0, 6860, 353.2, 410.4, 9060, 1664A, SM 4500CN-E, 4500H-B, 4500NO3-F, 4500CL-D, 5220D, 5310C, 2130B, 2320B, 2540C, 3005A, 3015, 9010B, 9056. Organic Parameters: EPA 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330A, 8082, 8082A, 8081A, 8081B, 3510C, 5030B, MassDEP EPH, MassDEP VPH.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 200.7, 6010B, 6010C, 7471A, 6860, 1311, 1312, 3050B, 7196A, 9010B, 9012A, 9040B, 9045C, 3500-CR-D, 4500CN-CE, 2540G, Organic Parameters: EPA 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330A/B-prep, 8082, 8082A, 8081A, 8081B, 3540C, 3546, 3580A, 5035A, MassDEP EPH, MassDEP VPH.)

The following analytes are not included in our current NELAP/TNI Scope of Accreditation:

EPA 8260B: Freon-113, 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene. **EPA 8330A:** PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT. **EPA 8270C:** Methyl naphthalene, Dimethyl naphthalene, Total Methyl naphthalenes, Total Dimethyl naphthalenes, 1,4-Diphenylhydrazine (Azobenzene). **EPA 625:** 4-Chloroaniline, 4-Methylphenol. Total Phosphorus in a soil matrix, Chloride in a soil matrix, TKN in a soil matrix, NO₂ in a soil matrix, NO₃ in a soil matrix, SO₄ in a soil matrix. **EPA 9071:** Total Petroleum Hydrocarbons, Oil & Grease.



CHAIN OF CUSTODY

PAGE 1 OF 1

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

MANFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: THANE & DODD

Address: 446 MAIN ST.

WILMINGTON, MA

Phone: 508-754-2201

Fax:

Email:

☐ These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

If MS is required, indicate in Sample Specific Comments which samples and what tests MS to be performed.
(Note: All CAM methods for inorganic analyses require MS every 20 soil samples)

SOILS EXTRACTION, DL 2 1999

ALPHA Lab ID
(Lab Use Only)

Sample ID

Collection
Date Time

Sample
Matrix

Sampler's
Initials

16136-01

PCB-02

3/4/2015

X1

JAV

X

X1 = PAINT

1

Project Information

Project Name: TOXICITY REPORT

Project Location: WILMINGTON, MA

Project #: 1-006

Project Manager: JOE WALLACE

ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due: 9/18/12 Time:

Date Rec'd in Lab:

9/11/12

Report Information - Data Deliverables

☒ FAX ☐ EMAIL

☒ ADEx ☐ Add'l Deliverables

Regulatory Requirements/Report Limits

State/Fed Program EPA

Criteria TCAB

MA MCP PRESUMPTIVE CERTAINTY --- CT REASONABLE CONFIDENCE PROTO

☐ Yes ☒ No Are MCP Analytical Methods Required?

☐ Yes ☒ No Is Matrix Spike (MS) Required on this SDG? (If yes see note in Comments)

☐ Yes ☒ No Are CT RCP (Reasonable Confidence Protocols) Required?

ANALYSIS

PCBS

SAMPLE HANDLING

Filtration ☐ Done

☒ Not needed

☐ Lab to do

☐ Preservation

☐ Lab to do

(Please specify below)

Sample Specific Comments

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MA MCP or CT RCP?

Relinquished By:

Date/Time

Received By:

Date/Time

Container Type
Preservative

A

A

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.



ANALYTICAL REPORT

Lab Number:	L1215096
Client:	Tighe & Bond, Inc. 446 Main Street Worcester, MA 01608
ATTN:	Jonathan Van Hazinga
Phone:	(508) 754-2201
Project Name:	IPSWICH WWTP
Project Number:	I-0066
Report Date:	08/30/12

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAC00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1215096-01	P-01	IPSWICH, MA	08/21/12 10:45
L1215096-02	P-02	IPSWICH, MA	08/21/12 11:05
L1215096-03	P-03	IPSWICH, MA	08/21/12 11:25
L1215096-04	P-04	IPSWICH, MA	08/21/12 13:10
L1215096-05	P-05	IPSWICH, MA	08/21/12 13:25
L1215096-06	CMU-01	IPSWICH, MA	08/21/12 11:40
L1215096-07	CMU-02	IPSWICH, MA	08/21/12 11:55
L1215096-08	CMU-03	IPSWICH, MA	08/21/12 13:35
L1215096-09	CMU-04	IPSWICH, MA	08/21/12 13:50
L1215096-10	C-01	IPSWICH, MA	08/21/12 12:10
L1215096-11	C-02	IPSWICH, MA	08/21/12 12:25
L1215096-12	C-03	IPSWICH, MA	08/21/12 12:35
L1215096-13	C-04	IPSWICH, MA	08/21/12 12:50

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples free of charge for 30 days from the date the project is completed. After 30 days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

Case Narrative (continued)

PCBs

L1215096-10 has elevated detection limits due to the dilution required by matrix interferences encountered during the concentration of the sample.

The surrogate recoveries for L1215096-01 through -05, -07, -08, -09, -11, -12 and -13 are below the acceptance criteria for 2,4,5,6-Tetrachloro-m-xylene and Decachlorobiphenyl (all at 0%) due to the dilutions required to quantitate the samples. Re-extraction was not required; therefore, the results of the original analyses are reported.

WG558124: Due to laboratory error the LCSD can not be reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Elizabeth Simmons

Title: Technical Director/Representative

Date: 08/30/12

ORGANICS



PCBS



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-01 D
 Client ID: P-01
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 09:57
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 08/21/12 10:45
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	235000	--	4000
Aroclor 1221	ND		ug/kg	235000	--	4000
Aroclor 1232	ND		ug/kg	235000	--	4000
Aroclor 1242	ND		ug/kg	235000	--	4000
Aroclor 1248	ND		ug/kg	157000	--	4000
Aroclor 1254	2160000		ug/kg	235000	--	4000
Aroclor 1260	ND		ug/kg	157000	--	4000
Aroclor 1262	ND		ug/kg	78400	--	4000
Aroclor 1268	ND		ug/kg	78400	--	4000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-02 D
 Client ID: P-02
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 10:09
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 08/21/12 11:05
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/27/12 10:30
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	602000	--	5000
Aroclor 1221	ND		ug/kg	602000	--	5000
Aroclor 1232	ND		ug/kg	602000	--	5000
Aroclor 1242	ND		ug/kg	602000	--	5000
Aroclor 1248	ND		ug/kg	402000	--	5000
Aroclor 1254	7270000		ug/kg	602000	--	5000
Aroclor 1260	ND		ug/kg	402000	--	5000
Aroclor 1262	ND		ug/kg	201000	--	5000
Aroclor 1268	ND		ug/kg	201000	--	5000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-03 D
 Client ID: P-03
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 10:21
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 08/21/12 11:25
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	298000	--	5000
Aroclor 1221	ND		ug/kg	298000	--	5000
Aroclor 1232	ND		ug/kg	298000	--	5000
Aroclor 1242	ND		ug/kg	298000	--	5000
Aroclor 1248	ND		ug/kg	198000	--	5000
Aroclor 1254	2870000		ug/kg	298000	--	5000
Aroclor 1260	ND		ug/kg	198000	--	5000
Aroclor 1262	ND		ug/kg	99200	--	5000
Aroclor 1268	ND		ug/kg	99200	--	5000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-04 D
 Client ID: P-04
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 10:33
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 08/21/12 13:10
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	53100	--	1000
Aroclor 1221	ND		ug/kg	53100	--	1000
Aroclor 1232	ND		ug/kg	53100	--	1000
Aroclor 1242	ND		ug/kg	53100	--	1000
Aroclor 1248	ND		ug/kg	35400	--	1000
Aroclor 1254	855000		ug/kg	53100	--	1000
Aroclor 1260	ND		ug/kg	35400	--	1000
Aroclor 1262	ND		ug/kg	17700	--	1000
Aroclor 1268	ND		ug/kg	17700	--	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-05 D
 Client ID: P-05
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 10:46
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 08/21/12 13:25
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	285000	--	5000
Aroclor 1221	ND		ug/kg	285000	--	5000
Aroclor 1232	ND		ug/kg	285000	--	5000
Aroclor 1242	ND		ug/kg	285000	--	5000
Aroclor 1248	ND		ug/kg	190000	--	5000
Aroclor 1254	2430000		ug/kg	285000	--	5000
Aroclor 1260	ND		ug/kg	190000	--	5000
Aroclor 1262	ND		ug/kg	95000	--	5000
Aroclor 1268	ND		ug/kg	95000	--	5000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-06
 Client ID: CMU-01
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 00:11
 Analyst: KB
 Percent Solids: 96%

Date Collected: 08/21/12 11:40
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	59.2	--	1
Aroclor 1221	ND		ug/kg	59.2	--	1
Aroclor 1232	ND		ug/kg	59.2	--	1
Aroclor 1242	ND		ug/kg	59.2	--	1
Aroclor 1248	ND		ug/kg	39.4	--	1
Aroclor 1254	934		ug/kg	59.2	--	1
Aroclor 1260	ND		ug/kg	39.4	--	1
Aroclor 1262	ND		ug/kg	19.7	--	1
Aroclor 1268	ND		ug/kg	19.7	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	71		30-150
Decachlorobiphenyl	77		30-150
2,4,5,6-Tetrachloro-m-xylene	70		30-150
Decachlorobiphenyl	69		30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-07 D
 Client ID: CMU-02
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/29/12 23:05
 Analyst: KB
 Percent Solids: 98%

Date Collected: 08/21/12 11:55
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	5500	--	100
Aroclor 1221	ND		ug/kg	5500	--	100
Aroclor 1232	ND		ug/kg	5500	--	100
Aroclor 1242	ND		ug/kg	5500	--	100
Aroclor 1248	ND		ug/kg	3670	--	100
Aroclor 1260	ND		ug/kg	3670	--	100
Aroclor 1262	ND		ug/kg	1840	--	100
Aroclor 1268	ND		ug/kg	1840	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-07 D
 Client ID: CMU-02
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/29/12 23:05
 Analyst: KB
 Percent Solids: 98%

Date Collected: 08/21/12 11:55
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1254	164000		ug/kg	5500	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-08 D
 Client ID: CMU-03
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/29/12 23:18
 Analyst: KB
 Percent Solids: 100%

Date Collected: 08/21/12 13:35
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	5100	--	100
Aroclor 1221	ND		ug/kg	5100	--	100
Aroclor 1232	ND		ug/kg	5100	--	100
Aroclor 1242	ND		ug/kg	5100	--	100
Aroclor 1248	ND		ug/kg	3400	--	100
Aroclor 1254	106000		ug/kg	5100	--	100
Aroclor 1260	ND		ug/kg	3400	--	100
Aroclor 1262	ND		ug/kg	1700	--	100
Aroclor 1268	ND		ug/kg	1700	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-09 D
 Client ID: CMU-04
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 14:49
 Analyst: BL
 Percent Solids: 97%

Date Collected: 08/21/12 13:50
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/29/12 16:20
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/30/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/30/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	10700	--	200
Aroclor 1221	ND		ug/kg	10700	--	200
Aroclor 1232	ND		ug/kg	10700	--	200
Aroclor 1242	ND		ug/kg	10700	--	200
Aroclor 1248	ND		ug/kg	7110	--	200
Aroclor 1254	185000		ug/kg	10700	--	200
Aroclor 1260	ND		ug/kg	7110	--	200
Aroclor 1262	ND		ug/kg	3550	--	200
Aroclor 1268	ND		ug/kg	3550	--	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-10
 Client ID: C-01
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 14:00
 Analyst: BL
 Percent Solids: 97%

Date Collected: 08/21/12 12:10
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/29/12 16:20
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/30/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/30/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	169	--	3
Aroclor 1221	ND		ug/kg	169	--	3
Aroclor 1232	ND		ug/kg	169	--	3
Aroclor 1242	ND		ug/kg	169	--	3
Aroclor 1248	ND		ug/kg	113	--	3
Aroclor 1254	3880		ug/kg	169	--	3
Aroclor 1260	ND		ug/kg	113	--	3
Aroclor 1262	ND		ug/kg	56.4	--	3
Aroclor 1268	ND		ug/kg	56.4	--	3

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	105		30-150
Decachlorobiphenyl	95		30-150
2,4,5,6-Tetrachloro-m-xylene	90		30-150
Decachlorobiphenyl	51		30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-11 D
 Client ID: C-02
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/30/12 10:58
 Analyst: KB
 Percent Solids: 97%

Date Collected: 08/21/12 12:25
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	1220	--	20
Aroclor 1221	ND		ug/kg	1220	--	20
Aroclor 1232	ND		ug/kg	1220	--	20
Aroclor 1242	ND		ug/kg	1220	--	20
Aroclor 1248	ND		ug/kg	815	--	20
Aroclor 1254	11400		ug/kg	1220	--	20
Aroclor 1260	ND		ug/kg	815	--	20
Aroclor 1262	ND		ug/kg	407	--	20
Aroclor 1268	ND		ug/kg	407	--	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-12 D
 Client ID: C-03
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/29/12 23:44
 Analyst: KB
 Percent Solids: 97%

Date Collected: 08/21/12 12:35
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	1110	--	20
Aroclor 1221	ND		ug/kg	1110	--	20
Aroclor 1232	ND		ug/kg	1110	--	20
Aroclor 1242	ND		ug/kg	1110	--	20
Aroclor 1248	ND		ug/kg	740	--	20
Aroclor 1260	ND		ug/kg	740	--	20
Aroclor 1262	ND		ug/kg	370	--	20
Aroclor 1268	ND		ug/kg	370	--	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-12 D
 Client ID: C-03
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/29/12 23:44
 Analyst: KB
 Percent Solids: 97%

Date Collected: 08/21/12 12:35
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1254	14100		ug/kg	1110	--	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-13 D
 Client ID: C-04
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/29/12 23:57
 Analyst: KB
 Percent Solids: 98%

Date Collected: 08/21/12 12:50
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	3240	--	60
Aroclor 1221	ND		ug/kg	3240	--	60
Aroclor 1232	ND		ug/kg	3240	--	60
Aroclor 1242	ND		ug/kg	3240	--	60
Aroclor 1248	ND		ug/kg	2160	--	60
Aroclor 1260	ND		ug/kg	2160	--	60
Aroclor 1262	ND		ug/kg	1080	--	60
Aroclor 1268	ND		ug/kg	1080	--	60

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-13 D
 Client ID: C-04
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082A
 Analytical Date: 08/29/12 23:57
 Analyst: KB
 Percent Solids: 98%

Date Collected: 08/21/12 12:50
 Date Received: 08/23/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 08/26/12 00:15
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1254	18000		ug/kg	3240	--	60

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A
 Analytical Date: 08/28/12 10:58
 Analyst: KB

Extraction Method: EPA 3540C
 Extraction Date: 08/25/12 21:34
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL
PCB by GC - Westborough Lab for sample(s): 01,03-08,11-13 Batch: WG557092-1					
Aroclor 1016	ND		ug/kg	59.5	--
Aroclor 1221	ND		ug/kg	59.5	--
Aroclor 1232	ND		ug/kg	59.5	--
Aroclor 1242	ND		ug/kg	59.5	--
Aroclor 1248	ND		ug/kg	39.7	--
Aroclor 1254	ND		ug/kg	59.5	--
Aroclor 1260	ND		ug/kg	39.7	--
Aroclor 1262	ND		ug/kg	19.8	--
Aroclor 1268	ND		ug/kg	19.8	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	73		30-150
Decachlorobiphenyl	75		30-150
2,4,5,6-Tetrachloro-m-xylene	63		30-150
Decachlorobiphenyl	60		30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A
 Analytical Date: 08/30/12 12:59
 Analyst: BL

Extraction Method: EPA 3540C
 Extraction Date: 08/29/12 16:20
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/30/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/30/12

Parameter	Result	Qualifier	Units	RL	MDL
PCB by GC - Westborough Lab for sample(s): 09-10 Batch: WG557863-1					
Aroclor 1016	ND		ug/kg	58.8	--
Aroclor 1221	ND		ug/kg	58.8	--
Aroclor 1232	ND		ug/kg	58.8	--
Aroclor 1242	ND		ug/kg	58.8	--
Aroclor 1248	ND		ug/kg	39.2	--
Aroclor 1254	ND		ug/kg	58.8	--
Aroclor 1260	ND		ug/kg	39.2	--
Aroclor 1262	ND		ug/kg	19.6	--
Aroclor 1268	ND		ug/kg	19.6	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	70		30-150
Decachlorobiphenyl	63		30-150
2,4,5,6-Tetrachloro-m-xylene	65		30-150
Decachlorobiphenyl	56		30-150



Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A
 Analytical Date: 08/30/12 16:05
 Analyst: KB

Extraction Method: EPA 3540C
 Extraction Date: 08/27/12 10:30
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 08/28/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 08/28/12

Parameter	Result	Qualifier	Units	RL	MDL
PCB by GC - Westborough Lab for sample(s): 02 Batch: WG558124-1					
Aroclor 1016	ND		ug/kg	59.5	--
Aroclor 1221	ND		ug/kg	59.5	--
Aroclor 1232	ND		ug/kg	59.5	--
Aroclor 1242	ND		ug/kg	59.5	--
Aroclor 1248	ND		ug/kg	39.7	--
Aroclor 1254	ND		ug/kg	59.5	--
Aroclor 1260	ND		ug/kg	39.7	--
Aroclor 1262	ND		ug/kg	19.8	--
Aroclor 1268	ND		ug/kg	19.8	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	79		30-150
Decachlorobiphenyl	86		30-150
2,4,5,6-Tetrachloro-m-xylene	75		30-150
Decachlorobiphenyl	86		30-150



Lab Control Sample Analysis

Batch Quality Control

Project Name: IPSWICH WWTP

Project Number: I-0066

Lab Number: L1215096

Report Date: 08/30/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB by GC - Westborough Lab Associated sample(s): 01,03-08,11-13 Batch: WG557092-2 WG557092-3								
Aroclor 1016	71		64		40-140	10		50
Aroclor 1260	78		68		40-140	14		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	66		61		30-150
Decachlorobiphenyl	77		70		30-150
2,4,5,6-Tetrachloro-m-xylene	61		62		30-150
Decachlorobiphenyl	61		60		30-150

PCB by GC - Westborough Lab Associated sample(s): 09-10 Batch: WG557863-2 WG557863-3								
Aroclor 1016	99		107		40-140	8		50
Aroclor 1260	88		100		40-140	13		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	104		106		30-150
Decachlorobiphenyl	79		85		30-150
2,4,5,6-Tetrachloro-m-xylene	95		96		30-150
Decachlorobiphenyl	67		72		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB by GC - Westborough Lab Associated sample(s): 02 Batch: WG558124-2								
Aroclor 1016	87		-		40-140	-		50
Aroclor 1260	89		-		40-140	-		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	85				30-150
Decachlorobiphenyl	95				30-150
2,4,5,6-Tetrachloro-m-xylene	85				30-150
Decachlorobiphenyl	102				30-150

INORGANICS & MISCELLANEOUS



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-06
Client ID: CMU-01
Sample Location: IPSWICH, MA
Matrix: Solid

Date Collected: 08/21/12 11:40
Date Received: 08/23/12
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	96		%	0.10	NA	1	-	08/24/12 12:13	30,2540G	CM



Project Name: IPSWICH WWTP

Project Number: I-0066

Lab Number: L1215096

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-07

Client ID: CMU-02

Sample Location: IPSWICH, MA

Matrix: Solid

Date Collected: 08/21/12 11:55

Date Received: 08/23/12

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	98		%	0.10	NA	1	-	08/24/12 12:13	30,2540G	CM



Project Name: IPSWICH WWTP
Project Number: I-0066

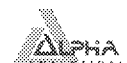
Lab Number: L1215096
Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-08
Client ID: CMU-03
Sample Location: IPSWICH, MA
Matrix: Solid

Date Collected: 08/21/12 13:35
Date Received: 08/23/12
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	100		%	0.10	NA	1	-	08/24/12 12:13	30,2540G	CM



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-09
Client ID: CMU-04
Sample Location: IPSWICH, MA
Matrix: Solid

Date Collected: 08/21/12 13:50
Date Received: 08/23/12
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	97		%	0.10	NA	1	-	08/24/12 12:13	30,2540G	CM



Project Name: IPSWICH WWTP

Project Number: I-0066

Lab Number: L1215096

Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-10

Client ID: C-01

Sample Location: IPSWICH, MA

Matrix: Solid

Date Collected: 08/21/12 12:10

Date Received: 08/23/12

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	97		%	0.10	NA	1	-	08/24/12 12:13	30,2540G	CM



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-11
Client ID: C-02
Sample Location: IPSWICH, MA
Matrix: Solid

Date Collected: 08/21/12 12:25
Date Received: 08/23/12
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	97		%	0.10	NA	1	-	08/24/12 12:13	30,2540G	CM



Project Name: IPSWICH WWTP
Project Number: I-0066

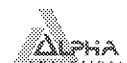
Lab Number: L1215096
Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-12
Client ID: C-03
Sample Location: IPSWICH, MA
Matrix: Solid

Date Collected: 08/21/12 12:35
Date Received: 08/23/12
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	97		%	0.10	NA	1	-	08/24/12 12:13	30,2540G	CM



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

SAMPLE RESULTS

Lab ID: L1215096-13
Client ID: C-04
Sample Location: IPSWICH, MA
Matrix: Solid

Date Collected: 08/21/12 12:50
Date Received: 08/23/12
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	98		%	0.10	NA	1	-	08/24/12 12:13	30,2540G	CM



Lab Duplicate Analysis
Batch Quality Control

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 06-13 QC Batch ID: WG556897-1 QC Sample: L1215096-06 Client ID: CMU-01						
Solids, Total	96	96	%	0		20

Project Name: IPSWICH WWTP

Lab Number: L1215096

Project Number: I-0066

Report Date: 08/30/12

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information Custody Seal

Cooler

A Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1215096-01A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	PCB-8082LL-3540C(14)
L1215096-02A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	PCB-8082LL-3540C(14)
L1215096-03A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	PCB-8082LL-3540C(14)
L1215096-04A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	PCB-8082LL-3540C(14)
L1215096-05A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	PCB-8082LL-3540C(14)
L1215096-06A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	TS(7),PCB-8082LL-3540C(14)
L1215096-07A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	TS(7),PCB-8082LL-3540C(14)
L1215096-08A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	TS(7),PCB-8082LL-3540C(14)
L1215096-09A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	TS(7),PCB-8082LL-3540C(14)
L1215096-10A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	TS(7),PCB-8082LL-3540C(14)
L1215096-11A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	TS(7),PCB-8082LL-3540C(14)
L1215096-12A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	TS(7),PCB-8082LL-3540C(14)
L1215096-13A	Amber 250ml unpreserved	A	N/A	3.7	Y	Absent	TS(7),PCB-8082LL-3540C(14)

Container Comments

L1215096-02A

*Values in parentheses indicate holding time in days



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

GLOSSARY

Acronyms

EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

- | | |
|-----------|---|
| A | - Spectra identified as "Aldol Condensation Product". |
| B | - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than five times (5x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. |
| C | - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses. |
| D | - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte. |
| E | - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument. |
| G | - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated. |
| H | - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection. |
| I | - The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported due to obvious interference. |
| M | - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte. |
| NJ | - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search. |

Report Format: Data Usability Report



Project Name: IPSWICH WWTP**Lab Number:** L1215096**Project Number:** I-0066**Report Date:** 08/30/12**Data Qualifiers**

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1215096
Report Date: 08/30/12

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997.
- 30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certificate/Approval Program Summary

Last revised August 16, 2012 - Westboro Facility

The following list includes only those analytes/methods for which certification/approval is currently held.
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

Connecticut Department of Public Health Certificate/Lab ID: PH-0574. NELAP Accredited Solid Waste/Soil.

Drinking Water (Inorganic Parameters: Color, pH, Turbidity, Conductivity, Alkalinity, Chloride, Free Residual Chlorine, Fluoride, Calcium Hardness, Sulfate, Nitrate, Nitrite, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Selenium, Silver, Sodium, Thallium, Zinc, Total Dissolved Solids, Total Organic Carbon, Total Cyanide, Perchlorate. Organic Parameters: Volatile Organics 524.2, Total Trihalomethanes 524.2, 1,2-Dibromo-3-chloropropane (DBCP) 504.1, Ethylene Dibromide (EDB) 504.1, 1,4-Dioxane (Mod 8270). Microbiology Parameters: Total Coliform-MF mEndo (SM9222B), Total Coliform – Colilert (SM9223, Enumeration and P/A), E. Coli. – Colilert (SM9223, Enumeration and P/A), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform-EC Medium (SM 9221E).

Wastewater/Non-Potable Water (Inorganic Parameters: Color, pH, Conductivity, Acidity, Alkalinity, Chloride, Total Residual Chlorine, Fluoride, Total Hardness, Silica, Sulfate, Sulfide, Ammonia, Kjeldahl Nitrogen, Nitrate, Nitrite, O-Phosphate, Total Phosphorus, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Dissolved Solids, Total Suspended Solids (non-filterable), BOD, CBOD, COD, TOC, Total Cyanide, Phenolics, Foaming Agents (MBAS), Bromide, Oil and Grease. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables (Phenols), Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, Polynuclear Aromatic Hydrocarbons, Haloethers, Chlorinated Hydrocarbons, Volatile Organics, TPH (HEM/SGT), CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH. Microbiology Parameters: Total Coliform – MF mEndo (SM9222B), Total Coliform – MTF (SM9221B), E. Coli – Colilert (SM9223 Enumeration), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform – A-1 Broth (SM9221E), Enterococcus - Enterolert.

Solid Waste/Soil (Inorganic Parameters: pH, Sulfide, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Tin, Vanadium, Zinc, Total Cyanide, Ignitability, Phenolics, Corrosivity, TCLP Leach (1311), SPLP Leach (1312 metals only), Reactivity. Organic Parameters: PCBs, PCBs in Oil, Organochlorine Pesticides, Technical Chlordane, Toxaphene, CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH, Dicamba, 2,4-D, 2,4,5-T, 2,4,5-TP (Silvex), Dalapon, Volatile Organics (SW 8260), Acid Extractables (Phenols) (SW 8270), Benzidines (SW 8270), Phthalates (SW 8270), Nitrosamines (SW 8270), Nitroaromatics & Cyclic Ketones (SW 8270), PAHs (SW 8270), Haloethers (SW 8270), Chlorinated Hydrocarbons (SW 8270).)

Maine Department of Human Services Certificate/Lab ID: 2009024.

Drinking Water (Inorganic Parameters: SM9215B, 9222D, 9223B, EPA 180.1, 353.2, SM2130B, 2320B, 2540C, 4500CI-D, 4500CN-C, 4500CN-E, 4500F-C, 4500H+B, 4500NO3-F, EPA 200.7, EPA 200.8, 245.1, EPA 300.0. Organic Parameters: 504.1, 524.2.)

Wastewater/Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664A, 350.1, 351.1, 353.2, 410.4, 420.1, SM2320B, 2510B, 2540C, 2540D, 426C, 4500CI-D, 4500CI-E, 4500CN-C, 4500CN-E, 4500F-B, 4500F-C, 4500H+B, 4500Norg-B, 4500Norg-C, 4500NH3-B, 4500NH3-G, 4500NO3-F, 4500P-B, 4500P-E, 5210B, 5220D, 5310C, 9010B, 9040B, 9030B, 7470A, 7196A, 2340B, EPA 200.7, 6010B, 200.8, 6020, 245.1, 1311, 1312, 3005A, Enterolert, 9223D, 9222D. Organic Parameters: 608, 624, 625, 8081A, 8082, 8330, 8151A, 8260B, 8270C, 3510C, 3630C, 5030B, ME-DRO, ME-GRO, MA-EPH, MA-VPH.)

Solid Waste/Soil (Inorganic Parameters: 9010B, 9012A, 9014A, 9030B, 9040B, 9045C, 6010B, 7471A, 7196A, 9050A, 1010, 1030, 9065, 1311, 1312, 3005A, 3050B. Organic Parameters: ME-DRO, ME-GRO, MA-EPH, MA-VPH, 8260B, 8270C, 8330, 8151A, 8081A, 8082, 3540C, 3546, 3580A, 3630C, 5030B, 5035.)

Massachusetts Department of Environmental Protection Certificate/Lab ID: M-MA086.

Drinking Water (Inorganic Parameters: (EPA 200.8 for: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl) (EPA 200.7 for: Ba,Be,Ca,Cd,Cr,Cu,Na,Ni) 245.1, (300.0 for: Nitrate-N, Fluoride, Sulfate); (EPA 353.2 for: Nitrate-N, Nitrite-N); (SM4500NO3-F for: Nitrate-N and Nitrite-N); 4500F-C, 4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, 2320B, SM2540C, SM4500H-B. Organic Parameters: (EPA 524.2 for: Trihalomethanes, Volatile Organics); (504.1 for: 1,2-Dibromoethane, 1,2-Dibromo-3-Chloropropane), EPA 332. Microbiology Parameters: SM9215B; ENZ. SUB. SM9223; ColilertQT SM9223B; MF-SM9222D.)

Non-Potable Water (Inorganic Parameters: (EPA 200.8 for: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn); (EPA 200.7

for: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn); 245.1, SM4500H,B, EPA 120.1, SM2510B, 2540C, 2340B, 2320B, 4500CL-E, 4500F-BC, 426C, SM4500NH3-BH, (EPA 350.1 for: Ammonia-N), LACHAT 10-107-06-1-B for Ammonia-N, SM4500NO3-F, 353.2 for Nitrate-N, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, 4500P-B,E, 5220D, EPA 410.4, SM 5210B, 5310C, 4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.

Organic Parameters: (EPA 624 for Volatile Halocarbons, Volatile Aromatics),(608 for: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT,Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs-Water), (EPA 625 for SVOC Acid Extractables and SVOC Base/Neutral Extractables), 600/4-81-045-PCB-Oil. Microbiology Parameters: (ColilertQT SM9223B; Enterolert-QT: SM9222D-MF.)

New Hampshire Department of Environmental Services Certificate/Lab ID: 200307. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM 9222B, 9223B, 9215B, EPA 200.7, 200.8, 300.0, SM4500CN-E, 4500H+B, 4500NO3-F, 2320B, 2510B, 2540C, 4500F-C, 5310C, 2120B, EPA 332.0. Organic Parameters: 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: SM9222D, 9221B, 9222B, 9221E-EC, EPA 3005A, 200.7, 200.8, 245.1, SW-846 6010B, 6010C, 6020, 6020A, 7196A, 7470A, SM3500-CR-D, EPA 120.1, 300.0, 350.1, 350.2, 351.1, 353.2, 410.4, 420.1, 426C, 1664A, SW-846 9010B, 9030B, 9040B, SM2120B, 2310B, 2320B, 2540B, 2540D, 4500H+B, 4500CL-E, 4500CN-E, 4500NH3-H, 4500NO3-F, 4500NO2-B, 4500P-E, 4500-S2-D, 5210B, 5220D, 2510B, 2540C, 4500F-C, 5310C, 5540C, LACHAT 10-204-00-1-A, LACHAT 10-107-06-2-D, 3060A. Organic Parameters: SW-846 3510C, 3630C, 5030B, 8260B, 8270C, 8270D, 8330, EPA 624, 625, 608, SW-846 8082, 8082A, 8081A, 8081B, 8151A, 8330, 8270C-SIM, 8270D-SIM.)

Solid & Chemical Materials (Inorganic Parameters: SW-846 6010B, 6010C, 7196A, 7471A, 1010, 1030, 9010, 9012A, 9014, 9030B, 9040B, 9045C, 9050, 9065,1311, 1312, 3005A, 3050B, 3060A. Organic Parameters: SW-846 3540C, 3546, 3050B, 3580A, 3630C, 5030B, 5035, 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, 8151A, 8015B, 8015C, 8082, 8082A, 8081A, 8081B.)

New Jersey Department of Environmental Protection Certificate/Lab ID: MA935. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM9222B, 9221E, 9223B, 9215B, 4500CN-CE, 4500NO3-F, 4500F-C, EPA 300.0, 200.7, 200.8, 245.1, 2540C, SM2120B, 2320B, 2510B, 5310C, SM4500H-B. Organic Parameters: EPA 332, 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: SM5210B, EPA 410.4, SM5220D, 4500CI-E, EPA 300.0, SM2120B, 2340B, SM4500F-BC, EPA 200.7, 200.8, 351.1, LACHAT 10-107-06-2-D, EPA 353.2, SM4500NO3-F, 4500NO2-B, EPA 1664A, SM5310B, C or D, 4500-PE, EPA 420.1, SM510ABC, SM4500P-B5+E, 2540B, 2540C, 2540D, 2540G, EPA 120.1, SM2510B, SM2520B, SM15 426C, 9222D, 9221B, 9221C, 9221E, 9222B, 9215B, 2310B, 2320B, 4500NH3-H, 4500-S D, EPA 350.1, 350.2, SW-846 1312, 7470A, 5540C, SM4500H-B, 4500SO3-B, SM3500Cr-D, 4500CN-CE, EPA 245.1, SW-846 9040B, 3005A, 3015, EPA 6010B, 6010C, 6020, 6020A, 7196A, 3060A, SW-846 9010B, 9030B. Organic Parameters: SW-846 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3510C, EPA 608, 624, 625, SW-846 3630C, 5030B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 1,4-Dioxane by NJ Modified 8270, 8015B, NJ EPH.)

Solid & Chemical Materials (Inorganic Parameters: SW-846, 6010B, 6010C, 6020, 6020A, 7196A, 3060A, 9010B, 9030B, 1010, 1030, 1311, 1312, 3005A, 3050B, 7471A, 7471B, 9014, 9012A, 9040B, 9040C, 9045C, 9045D, 9050A, 9065, 9251. Organic Parameters: SW-846 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3540C, 3546, 3580A, 3630C, 5030B, 5035L, 5035H, NJ OQA-QAM-025 Rev.7, NJ EPH.)

New York Department of Health Certificate/Lab ID: 11148. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM9223B, 9222B, 9215B, EPA 200.8, 200.7, 245.2, SM5310C, EPA 332.0, SM2320B, EPA 300.0, SM2120B, 4500CN-E, 4500F-C, 4500NO3-F, 2540C, SM 2510B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: SM9221E, 9222D, 9221B, 9222B, 9215B, 5210B, 5310C, EPA 410.4, SM5220D, 2310B-4a, 2320B, EPA 200.7, 300.0, SM4500CL-E, 4500F-C, SM15 426C, EPA 350.1, SM4500NH3-BH, EPA 351.1, LACHAT 10-107-06-2, EPA 353.2, SM4500-NO3-F, 4500-NO2-B, 4500P-E, 2540C, 2540B, 2540D, EPA 200.8, EPA 6010B, 6010C, 6020, 6020A, EPA 7196A, SM3500Cr-D, EPA 245.1, 245.2, 7470A, SM2120B, LACHAT 10-204-00-1-A, 4500CN-CE, EPA 1664A, EPA 420.1, SM14 510C, EPA 120.1, SM2510B, SM4500S-D, SM5540C, EPA 3005A, 3015, 9010B, 9030B. Organic Parameters: EPA 624, 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 625, 608, 8081A, 8081B, 8151A, 8330, 8082, 8082A, EPA 3510C, 5030B.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010, 1030, EPA 6010B, 6010C, 7196A, 7471A, 7471B, 9012A, 9014, 9065, 9050A, EPA 1311, 1312, 3005A, 3050B, 9010B, 9040C, 9045D. Organic Parameters: EPA 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8015B, 8015C, 8081A, 8081B, 8151A, 8330, 8082 8082A, 3540C, 3546, 3580, 3580A, 5030B, 5035A-H, 5035A-L.)

North Carolina Department of the Environment and Natural Resources Certificate/Lab ID : 666. (Inorganic Parameters: SM2310B, 2320B, 4500Cl-E, 4500Cn-E, 9014, Lachat 10-204-00-1-X, 1010A, 1030, 4500NO3-F, 353.2, 4500P-E, 4500SO4-E, 300.0, 4500S-D, 5310B, 5310C, 6010C, 6020A, 200.7, 200.8, 3500Cr-B, 7196A, 245.1, 7471A, 7471B, 1311, 1312. Organic Parameters: 608, 8081B, 8082A, 624, 8260B, 625, 8270D, 8151A, 8015C, 504.1, MA-EPH, MA-VPH.)

Drinking Water Program Certificate/Lab ID: 25700. (Inorganic Parameters: Chloride EPA 300.0. Organic Parameters: 524.2)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-03671. *NELAP Accredited.*
Drinking Water (Inorganic Parameters: 200.7, 200.8, 245.2, 300.0, 332.0, 2120B, 2320B, 2510B, 2540C, 4500-CN-CE, 4500F-C, 4500H+-B, 4500NO3-F, 5310C. Organic Parameters: EPA 524.2, 504.1)

Non-Potable Water (Inorganic Parameters: EPA 120.1, 1312, 3005A, 3015, 3060A, 200.7, 200.8, 410.4, 1664A, SM2540D, 5210B, 5220D, 4500-P, BE, 245.1, 300.0, 3501., 350.2, 353.2, 420.1, 6010B, 6010C, 6020, 6020A, 7196A, 7470A, 9010B, 9030B, 9040B, Lachat 10-107-06-2-D, NJ-EPH, 2120B, 2310B, 2320B, 2340B, 2510C, 2540B, 2540C, 3500Cr-D, 436C, 4500CN-CE, 4500Cl-E, 4500F-B, 4500F-C, 4500H+-B, 4500NO2-B, 4500NO3-F, 4500S-D, 4500SO3-B, 5310BCD, 5540C. Organic Parameters: EPA 3510C, 3630C, 5030B, 625, 624, 608, 8081A, 8081B, 8082, 8082A, 8151A, 8260B, 8270C, 8270D, 8330, 8015B,)

Solid & Hazardous Waste (Inorganic Parameters: EPA 350.1, 1010, 1030, 1311, 1312, 3005A, 3050B, 3060A, 6010B, 6010C, 6020A, 7196A, 7471A, 7471B, 9010B, 9012A, 9014, 9040B, 9045C, 9050, 9065, SM 4500NH3-BH, 9030B, 9038, 9251. Organic Parameters: 3540C, 3546, 3580A, 3630C, 5035, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, NJ-EPH.)

Rhode Island Department of Health Certificate/Lab ID: LAO00065. *NELAP Accredited via NJ-DEP.*

Refer to MA-DEP Certificate for Potable and Non-Potable Water.

Refer to NJ-DEP Certificate for Potable and Non-Potable Water.

Texas Commission on Environmental Quality Certificate/Lab ID: T104704476-09-1. *NELAP Accredited.*

Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664, 200.7, 200.8, 245.1, 245.2, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1, 6010, 6020, 7196, 7470, 9040, SM 2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 426C, 4500CL-E, 4500CN-E, 4500F-C, 4500H+B, 4500NH3-H, 4500NO2B, 4500P-E, 4500 S²⁻D, 510C, 5210B, 5220D, 5310C, 5540C. Organic Parameters: EPA 608, 624, 625, 8081, 8082, 8151, 8260, 8270, 8330.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 1312, 9012, 9014, 9040, 9045, 9050, 9065.)

Virginia Division of Consolidated Laboratory Services Certificate/Lab ID: 460195. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: EPA 200.7, 200.8, 300.0, 2510B, 2120B, 2540C, 4500CN-CE, 245.2, 2320B, 4500F-C, 4500F-C, 4500NO3-F, 5310C. Organic Parameters: EPA 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664A, 200.7, 200.8, 245.1, 300.0, 3005A, 3015, 1312, 6010B, 6010C, 3060A, 353.2, 420.1, 6020, 6020A, SM4500S-D, SM4500-CN-CE, Lachat 10-204-00-1-X, 7196A, 7470A, 9010B, 9040B, 2310B, 2320B, 2510B, 2540B, 2540C, 3500Cr-D, 426C, 4500Cl-E, 4500F-B, 4500F-C, 4500PE, 510AC, 5210B, 5310B 5310C, 5540C. Organic Parameters: EPA 3510C, 3630C, 5030B, 8260B, 608, 624, 625, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330,)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010A, 1030, 3060A, 3050B, 1311, 1312, 6010B, 6010C, 6020, , 7196A, 7471A, 7471B, 6020A, 9030B, 9010B, 9012A, 9014 9040B, 9045C, 9050A, 9065. Organic Parameters: EPA 5035, 3540C, 3546, 3550, 3580, 3630C, 8260B, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330.)

Department of Defense, L-A-B Certificate/Lab ID: L2217.

Drinking Water (Inorganic Parameters: SM 4500H-B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: EPA 200.7, 200.8, 6010B, 6010C, 6020, 6020A, 245.1, 245.2, 7470A, 9040B, 9010B, 180.1, 300.0, 332.0, 6860, 353.2, 410.4, 9060, 1664A, SM 4500CN-E, 4500H-B, 4500NO3-F, 4500CL-D, 5220D, 5310C, 2130B, 2320B, 2540C, 3005A, 3015, 9010B, 9056. Organic Parameters: EPA 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330A, 8082, 8082A, 8081A, 8081B, 3510C, 5030B, MassDEP EPH, MassDEP VPH.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 200.7, 6010B, 6010C, 7471A, 6860, 1311, 1312, 3050B, 7196A, 9010B, 9012A, 9040B, 9045C, 3500-CR-D, 4500CN-CE, 2540G, Organic Parameters: EPA 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330A/B-prep, 8082, 8082A, 8081A, 8081B, 3540C, 3546, 3580A, 5035A, MassDEP EPH, MassDEP VPH.)

The following analytes are not included in our current NELAP/TNI Scope of Accreditation:

EPA 8260B: Freon-113, 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene. **EPA 8330A:** PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT. **EPA 8270C:** Methyl naphthalene, Dimethyl naphthalene, Total Methyl naphthalenes, Total Dimethyl naphthalenes, 1,4-Diphenylhydrazine (Azobenzene). **EPA 625:** 4-Chloroaniline, 4-Methylphenol. Total Phosphorus in a soil matrix, Chloride in a soil matrix, TKN in a soil matrix, NO₂ in a soil matrix, NO₃ in a soil matrix, SO₄ in a soil matrix. **EPA 9071:** Total Petroleum Hydrocarbons, Oil & Grease.

CHAIN OF CUSTODY

PAGE 1 OF 2



Westborough, MA
TEL: 508-896-9220
FAX: 508-896-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: Tighe & Bond, Inc.

Project Location: Ipswich, MA
Project #: 1-0066

Address: 446 Main Street

Project Manager: Jon Van Hazinga

Worcester, MA 01608

ALPHA Quote #:

Phone: 508.754.2201

Turn-Around Time

Fax: 508.795.1087

☒ Standard

☐ Rush (ONLY IF PRE-APPROVED)

Email: javanhazinga@tighebond.com

☐ These samples have been previously analyzed by Alpha

Due Date: 8/23/12 Time:

Other Project Specific Requirements/Comments/Detection Limits:

768: DE & 1 ppm, Soxhlet Extraction

Date Rec'd in Lab:

8.23.12

ALPHA Job #:

L12150910

Report Information Data Deliverables

☐ FAX

☐ EMAIL

☒ ADEX

☐ Add'l Deliverables

Billing Information

☒ Same as Client info

PO #:

Regulatory Requirements/Report Limits

State/Fed Program

CMR

Criteria

75CA

ANALYSIS

SAMPLE HANDLING

Filtration

☐ Done

☒ Not Needed

☐ Lab to do

Preservation

☐ Lab to do

(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID
(Lab Use Only)

Sample ID

Collection
Date Time

Sample
Matrix

Sampler's
Initials

768

Sample Specific
Comments

150910

P-01

8-21-12 1045

X1

BD/SAV

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Container Type
Preservative

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CHAIN OF CUSTODY

PAGE 2 OF 2

Project Information

Westborough, MA
TEL: 508.898.9220
FAX: 508.898.9193

Mansfield, MA
TEL: 508.822.9300
FAX: 508.822.9288

Client Information

Client: Tighe & Bond, Inc.

Address: 446 Main Street
Worcester, MA 01608

Phone: 508.754.2201

Fax: 508.795.1087

Email: javanhazinga@tighebond.com

Due Date: 8/20/12

Other Project Specific Requirements/Comments/Detection Limits:

DL < 1 ppm SOXNET EXTRACTION

Date Rec'd in Lab: 8.23.12
ALPHA Job #: L12150910

Report Information Data Deliverables

Billing Information

PO #:

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

FAA

TCR

ANALYSIS

SAMPLE HANDLING

- ☐ Filtration
- ☐ Done
- ☒ Not Needed
- ☐ Lab to do
- ☐ Lab to do (Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID
(Lab Use Only)

Sample ID

Collection
Date Time

Sample
Matrix

Sampler's
Initials

Sample Specific
Comments

150910

11 P-02

8/21/12 1235

X1

800/100

X1 = Preservative

12 C-03

8/21/12 1235

X1

800/100

X1 = Preservative

13 C-04

8/21/12 1235

X1

800/100

X1 = Preservative

Container Type

Preservative

Relinquished By:

Signature

Date/Time

Received By:

Signature

Date/Time



ANALYTICAL REPORT

Lab Number:	L1213454
Client:	Tighe & Bond, Inc. 446 Main Street Worcester, MA 01608
ATTN:	Jonathan Van Hazinga
Phone:	(508) 754-2201
Project Name:	IPSWICH WWTP
Project Number:	I-0066
Report Date:	08/03/12

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAC00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1213454
Report Date: 08/03/12

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1213454-01	PCB-05	IPSWICH, MA	03/02/12 09:50

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1213454
Report Date: 08/03/12

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples free of charge for 30 days from the date the project is completed. After 30 days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1213454
Report Date: 08/03/12

Case Narrative (continued)

Sample Receipt

The analysis of PCBs was received with the method required holding time exceeded and was performed at the client's request.

PCBs

The surrogate recovery for L1213454-01 is outside the individual acceptance criteria for 2,4,5,6-Tetrachloro-m-xylene and Decachlorobiphenyl (both 0%), but within the overall method allowances. The results of the original analysis are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Elizabeth Simmons

Title: Technical Director/Representative

Date: 08/03/12

ORGANICS



PCBS



Project Name: IPSWICH WWTP

Lab Number: L1213454

Project Number: I-0066

Report Date: 08/03/12

SAMPLE RESULTS

Lab ID: L1213454-01 D
 Client ID: PCB-05
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082
 Analytical Date: 07/31/12 19:10
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 09:50
 Date Received: 07/27/12
 Field Prep: Not Specified
 Extraction Method: EPA 3580A
 Extraction Date: 07/30/12 07:56
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 07/30/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 07/30/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	126000	--	50
Aroclor 1221	ND		ug/kg	126000	--	50
Aroclor 1232	ND		ug/kg	126000	--	50
Aroclor 1242	ND		ug/kg	126000	--	50
Aroclor 1248	ND		ug/kg	84000	--	50
Aroclor 1260	ND		ug/kg	84000	--	50
Aroclor 1262	ND		ug/kg	42000	--	50
Aroclor 1268	ND		ug/kg	42000	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1213454

Project Number: I-0066

Report Date: 08/03/12

SAMPLE RESULTS

Lab ID: L1213454-01 D
 Client ID: PCB-05
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082
 Analytical Date: 07/31/12 19:10
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 09:50
 Date Received: 07/27/12
 Field Prep: Not Specified
 Extraction Method: EPA 3580A
 Extraction Date: 07/30/12 07:56
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 07/30/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 07/30/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1254	1570000		ug/kg	126000	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1213454

Project Number: I-0066

Report Date: 08/03/12

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082
 Analytical Date: 07/30/12 21:32
 Analyst: KB

Extraction Method: EPA 3580A
 Extraction Date: 07/30/12 07:56
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 07/30/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 07/30/12

Parameter	Result	Qualifier	Units	RL	MDL
PCB by GC - Westborough Lab for sample(s): 01 Batch: WG551578-1					
Aroclor 1016	ND		ug/kg	2700	--
Aroclor 1221	ND		ug/kg	2700	--
Aroclor 1232	ND		ug/kg	2700	--
Aroclor 1242	ND		ug/kg	2700	--
Aroclor 1248	ND		ug/kg	1800	--
Aroclor 1254	ND		ug/kg	2700	--
Aroclor 1260	ND		ug/kg	1800	--
Aroclor 1262	ND		ug/kg	901	--
Aroclor 1268	ND		ug/kg	901	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	84		30-150
Decachlorobiphenyl	84		30-150
2,4,5,6-Tetrachloro-m-xylene	81		30-150
Decachlorobiphenyl	78		30-150



Lab Control Sample Analysis

Batch Quality Control

Project Name: IPSWICH WWTP

Lab Number: L1213454

Project Number: I-0066

Report Date: 08/03/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB by GC - Westborough Lab Associated sample(s): 01 Batch: WG551578-2 WG551578-3								
Aroclor 1016	118		119		40-140	1		50
Aroclor 1260	81		80		40-140	1		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	99		98		30-150
Decachlorobiphenyl	91		92		30-150
2,4,5,6-Tetrachloro-m-xylene	93		93		30-150
Decachlorobiphenyl	88		89		30-150

Project Name: IPSWICH WWTP

Lab Number: L1213454

Project Number: I-0066

Report Date: 08/03/12

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information Custody Seal**Cooler**

A Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1213454-01A	Amber 250ml unpreserved	A	N/A	3	Y	Absent	PCB-8082LL-3540C(14)

*Values in parentheses indicate holding time in days



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1213454
Report Date: 08/03/12

GLOSSARY

Acronyms

EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than five times (5x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

Report Format: Data Usability Report



Project Name: IPSWICH WWTP**Lab Number:** L1213454**Project Number:** I-0066**Report Date:** 08/03/12**Data Qualifiers**

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1213454
Report Date: 08/03/12

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certificate/Approval Program Summary

Last revised August 3, 2012 - Westboro Facility

The following list includes only those analytes/methods for which certification/approval is currently held.
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

Connecticut Department of Public Health Certificate/Lab ID: PH-0574. NELAP Accredited Solid Waste/Soil.

Drinking Water (Inorganic Parameters: Color, pH, Turbidity, Conductivity, Alkalinity, Chloride, Free Residual Chlorine, Fluoride, Calcium Hardness, Sulfate, Nitrate, Nitrite, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Selenium, Silver, Sodium, Thallium, Zinc, Total Dissolved Solids, Total Organic Carbon, Total Cyanide, Perchlorate. Organic Parameters: Volatile Organics 524.2, Total Trihalomethanes 524.2, 1,2-Dibromo-3-chloropropane (DBCP) 504.1, Ethylene Dibromide (EDB) 504.1, 1,4-Dioxane (Mod 8270). Microbiology Parameters: Total Coliform-MF mEndo (SM9222B), Total Coliform – Colilert (SM9223, Enumeration and P/A), E. Coli. – Colilert (SM9223, Enumeration and P/A), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform-EC Medium (SM 9221E).

Wastewater/Non-Potable Water (Inorganic Parameters: Color, pH, Conductivity, Acidity, Alkalinity, Chloride, Total Residual Chlorine, Fluoride, Total Hardness, Silica, Sulfate, Sulfide, Ammonia, Kjeldahl Nitrogen, Nitrate, Nitrite, O-Phosphate, Total Phosphorus, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Dissolved Solids, Total Suspended Solids (non-filterable), BOD, CBOD, COD, TOC, Total Cyanide, Phenolics, Foaming Agents (MBAS), Bromide, Oil and Grease. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables (Phenols), Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, Polynuclear Aromatic Hydrocarbons, Haloethers, Chlorinated Hydrocarbons, Volatile Organics, TPH (HEM/SGT), CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH. Microbiology Parameters: Total Coliform – MF mEndo (SM9222B), Total Coliform – MTF (SM9221B), E. Coli – Colilert (SM9223 Enumeration), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform – A-1 Broth (SM9221E), Enterococcus - Enterolert.

Solid Waste/Soil (Inorganic Parameters: pH, Sulfide, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Tin, Vanadium, Zinc, Total Cyanide, Ignitability, Phenolics, Corrosivity, TCLP Leach (1311), SPLP Leach (1312 metals only), Reactivity. Organic Parameters: PCBs, PCBs in Oil, Organochlorine Pesticides, Technical Chlordane, Toxaphene, CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH, Dicamba, 2,4-D, 2,4,5-T, 2,4,5-TP (Silvex), Dalapon, Volatile Organics (SW 8260), Acid Extractables (Phenols) (SW 8270), Benzidines (SW 8270), Phthalates (SW 8270), Nitrosamines (SW 8270), Nitroaromatics & Cyclic Ketones (SW 8270), PAHs (SW 8270), Haloethers (SW 8270), Chlorinated Hydrocarbons (SW 8270).)

Maine Department of Human Services Certificate/Lab ID: 2009024.

Drinking Water (Inorganic Parameters: SM9215B, 9222D, 9223B, EPA 180.1, 353.2, SM2130B, 2320B, 2540C, 4500CI-D, 4500CN-C, 4500CN-E, 4500F-C, 4500H+B, 4500NO3-F, EPA 200.7, EPA 200.8, 245.1, EPA 300.0. Organic Parameters: 504.1, 524.2.)

Wastewater/Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664A, 350.1, 351.1, 353.2, 410.4, 420.1, SM2320B, 2510B, 2540C, 2540D, 426C, 4500CI-D, 4500CI-E, 4500CN-C, 4500CN-E, 4500F-B, 4500F-C, 4500H+B, 4500Norg-B, 4500Norg-C, 4500NH3-B, 4500NH3-G, 4500NO3-F, 4500P-B, 4500P-E, 5210B, 5220D, 5310C, 9010B, 9040B, 9030B, 7470A, 7196A, 2340B, EPA 200.7, 6010B, 200.8, 6020, 245.1, 1311, 1312, 3005A, Enterolert, 9223D, 9222D. Organic Parameters: 608, 624, 625, 8081A, 8082, 8330, 8151A, 8260B, 8270C, 3510C, 3630C, 5030B, ME-DRO, ME-GRO, MA-EPH, MA-VPH.)

Solid Waste/Soil (Inorganic Parameters: 9010B, 9012A, 9014A, 9030B, 9040B, 9045C, 6010B, 7471A, 7196A, 9050A, 1010, 1030, 9065, 1311, 1312, 3005A, 3050B. Organic Parameters: ME-DRO, ME-GRO, MA-EPH, MA-VPH, 8260B, 8270C, 8330, 8151A, 8081A, 8082, 3540C, 3546, 3580A, 3630C, 5030B, 5035.)

Massachusetts Department of Environmental Protection Certificate/Lab ID: M-MA086.

Drinking Water (Inorganic Parameters: (EPA 200.8 for: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl) (EPA 200.7 for: Ba,Be,Ca,Cd,Cr,Cu,Na,Ni) 245.1, (300.0 for: Nitrate-N, Fluoride, Sulfate); (EPA 353.2 for: Nitrate-N, Nitrite-N); (SM4500NO3-F for: Nitrate-N and Nitrite-N); 4500F-C, 4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, 2320B, SM2540C, SM4500H-B. Organic Parameters: (EPA 524.2 for: Trihalomethanes, Volatile Organics); (504.1 for: 1,2-Dibromoethane, 1,2-Dibromo-3-Chloropropane), EPA 332. Microbiology Parameters: SM9215B; ENZ. SUB. SM9223; ColilertQT SM9223B; MF-SM9222D.)

for: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn); 245.1, SM4500H,B, EPA 120.1, SM2510B, 2540C, 2340B, 2320B, 4500CL-E, 4500F-BC, 426C, SM4500NH3-BH, (EPA 350.1 for: Ammonia-N), LACHAT 10-107-06-1-B for Ammonia-N, SM4500NO3-F, 353.2 for Nitrate-N, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, 4500P-B,E, 5220D, EPA 410.4, SM 5210B, 5310C, 4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.

Organic Parameters: (EPA 624 for Volatile Halocarbons, Volatile Aromatics),(608 for: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT,Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs-Water), (EPA 625 for SVOC Acid Extractables and SVOC Base/Neutral Extractables), 600/4-81-045-PCB-Oil. Microbiology Parameters: (ColilertQT SM9223B; Enterolert-QT: SM9222D-MF.)

New Hampshire Department of Environmental Services Certificate/Lab ID: 200307. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM 9222B, 9223B, 9215B, EPA 200.7, 200.8, 300.0, SM4500CN-E, 4500H+B, 4500NO3-F, 2320B, 2510B, 2540C, 4500F-C, 5310C, 2120B, EPA 332.0. Organic Parameters: 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: SM9222D, 9221B, 9222B, 9221E-EC, EPA 3005A, 200.7, 200.8, 245.1, SW-846 6010B, 6010C, 6020, 6020A, 7196A, 7470A, SM3500-CR-D, EPA 120.1, 300.0, 350.1, 350.2, 351.1, 353.2, 410.4, 420.1, 426C, 1664A, SW-846 9010B, 9030B, 9040B, SM2120B, 2310B, 2320B, 2540B, 2540D, 4500H+B, 4500CL-E, 4500CN-E, 4500NH3-H, 4500NO3-F, 4500NO2-B, 4500P-E, 4500-S2-D, 5210B, 5220D, 2510B, 2540C, 4500F-C, 5310C, 5540C, LACHAT 10-204-00-1-A, LACHAT 10-107-06-2-D, 3060A. Organic Parameters: SW-846 3510C, 3630C, 5030B, 8260B, 8270C, 8270D, 8330, EPA 624, 625, 608, SW-846 8082, 8082A, 8081A, 8081B, 8151A, 8330, 8270C-SIM, 8270D-SIM.)

Solid & Chemical Materials (Inorganic Parameters: SW-846 6010B, 6010C, 7196A, 7471A, 1010, 1030, 9010, 9012A, 9014, 9030B, 9040B, 9045C, 9050, 9065,1311, 1312, 3005A, 3050B, 3060A. Organic Parameters: SW-846 3540C, 3546, 3050B, 3580A, 3630C, 5030B, 5035, 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, 8151A, 8015B, 8015C, 8082, 8082A, 8081A, 8081B.)

New Jersey Department of Environmental Protection Certificate/Lab ID: MA935. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM9222B, 9221E, 9223B, 9215B, 4500CN-CE, 4500NO3-F, 4500F-C, EPA 300.0, 200.7, 200.8, 245.1, 2540C, SM2120B, 2320B, 2510B, 5310C, SM4500H-B. Organic Parameters: EPA 332, 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: SM5210B, EPA 410.4, SM5220D, 4500CI-E, EPA 300.0, SM2120B, 2340B, SM4500F-BC, EPA 200.7, 200.8, 351.1, LACHAT 10-107-06-2-D, EPA 353.2, SM4500NO3-F, 4500NO2-B, EPA 1664A, SM5310B, C or D, 4500-PE, EPA 420.1, SM510ABC, SM4500P-B5+E, 2540B, 2540C, 2540D, 2540G, EPA 120.1, SM2510B, SM2520B, SM15 426C, 9222D, 9221B, 9221C, 9221E, 9222B, 9215B, 2310B, 2320B, 4500NH3-H, 4500-S D, EPA 350.1, 350.2, SW-846 1312, 7470A, 5540C, SM4500H-B, 4500SO3-B, SM3500Cr-D, 4500CN-CE, EPA 245.1, SW-846 9040B, 3005A, 3015, EPA 6010B, 6010C, 6020, 6020A, 7196A, 3060A, SW-846 9010B, 9030B. Organic Parameters: SW-846 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3510C, EPA 608, 624, 625, SW-846 3630C, 5030B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 1,4-Dioxane by NJ Modified 8270, 8015B, NJ EPH.)

Solid & Chemical Materials (Inorganic Parameters: SW-846, 6010B, 6010C, 6020, 6020A, 7196A, 3060A, 9010B, 9030B, 1010, 1030, 1311, 1312, 3005A, 3050B, 7471A, 7471B, 9014, 9012A, 9040B, 9040C, 9045C, 9045D, 9050A, 9065, 9251. Organic Parameters: SW-846 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3540C, 3546, 3580A, 3630C, 5030B, 5035L, 5035H, NJ OQA-QAM-025 Rev.7, NJ EPH.)

New York Department of Health Certificate/Lab ID: 11148. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM9223B, 9222B, 9215B, EPA 200.8, 200.7, 245.2, SM5310C, EPA 332.0, SM2320B, EPA 300.0, SM2120B, 4500CN-E, 4500F-C, 4500NO3-F, 2540C, SM 2510B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: SM9221E, 9222D, 9221B, 9222B, 9215B, 5210B, 5310C, EPA 410.4, SM5220D, 2310B-4a, 2320B, EPA 200.7, 300.0, SM4500CL-E, 4500F-C, SM15 426C, EPA 350.1, SM4500NH3-BH, EPA 351.1, LACHAT 10-107-06-2, EPA 353.2, SM4500-NO3-F, 4500-NO2-B, 4500P-E, 2540C, 2540B, 2540D, EPA 200.8, EPA 6010B, 6010C, 6020, 6020A, EPA 7196A, SM3500Cr-D, EPA 245.1, 245.2, 7470A, SM2120B, LACHAT 10-204-00-1-A, 4500CN-CE, EPA 1664A, EPA 420.1, SM14 510C, EPA 120.1, SM2510B, SM4500S-D, SM5540C, EPA 3005A, 3015, 9010B, 9030B. Organic Parameters: EPA 624, 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 625, 608, 8081A, 8081B, 8151A, 8330, 8082, 8082A, EPA 3510C, 5030B.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010, 1030, EPA 6010B, 6010C, 7196A, 7471A, 7471B, 9012A, 9014, 9065, 9050A, EPA 1311, 1312, 3005A, 3050B, 9010B, 9040C, 9045D. Organic Parameters: EPA 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8015B, 8015C, 8081A, 8081B, 8151A, 8330, 8082 8082A, 3540C, 3546, 3580, 3580A, 5030B, 5035A-H, 5035A-L.)

North Carolina Department of the Environment and Natural Resources Certificate/Lab ID : 666. (Inorganic Parameters: SM2310B, 2320B, 4500Cl-E, 4500Cn-E, 9014, Lachat 10-204-00-1-X, 1010A, 1030, 4500NO3-F, 353.2, 4500P-E, 4500SO4-E, 300.0, 4500S-D, 5310B, 5310C, 6010C, 6020A, 200.7, 200.8, 3500Cr-B, 7196A, 245.1, 7471A, 7471B, 1311, 1312. Organic Parameters: 608, 8081B, 8082A, 624, 8260B, 625, 8270D, 8151A, 8015C, 504.1, MA-EPH, MA-VPH.)

Drinking Water Program Certificate/Lab ID: 25700. (Inorganic Parameters: Chloride EPA 300.0. Organic Parameters: 524.2)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-03671. NELAP Accredited.
Drinking Water (Inorganic Parameters: 200.7, 200.8, 245.2, 300.0, 332.0, 2120B, 2320B, 2510B, 2540C, 4500-CN-CE, 4500F-C, 4500H+-B, 4500NO3-F, 5310C. Organic Parameters: EPA 524.2, 504.1)

Non-Potable Water (Inorganic Parameters: EPA 120.1, 1312, 3005A, 3015, 3060A, 200.7, 200.8, 410.4, 1664A, SM2540D, 5210B, 5220D, 4500-P, BE, 245.1, 300.0, 3501., 350.2, 353.2, 420.1, 6010B, 6010C, 6020, 6020A, 7196A, 7470A, 9010B, 9030B, 9040B, Lachat 10-107-06-2-D, NJ-EPH, 2120B, 2310B, 2320B, 2340B, 2510C, 2540B, 2540C, 3500Cr-D, 436C, 4500CN-CE, 4500Cl-E, 4500F-B, 4500F-C, 4500H+-B, 4500NO2-B, 4500NO3-F, 4500S-D, 4500SO3-B, 5310BCD, 5540C. Organic Parameters: EPA 3510C, 3630C, 5030B, 625, 624, 608, 8081A, 8081B, 8082, 8082A, 8151A, 8260B, 8270C, 8270D, 8330, 8015B,)

Solid & Hazardous Waste (Inorganic Parameters: EPA 350.1, 1010, 1030, 1311, 1312, 3005A, 3050B, 3060A, 6010B, 6010C, 6020A, 7196A, 7471A, 7471B, 9010B, 9012A, 9014, 9040B, 9045C, 9050, 9065, SM 4500NH3-BH, 9030B, 9038, 9251. Organic Parameters: 3540C, 3546, 3580A, 3630C, 5035, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, NJ-EPH.)

Rhode Island Department of Health Certificate/Lab ID: LAO00065. NELAP Accredited via NJ-DEP.
 Refer to MA-DEP Certificate for Potable and Non-Potable Water.
 Refer to NJ-DEP Certificate for Potable and Non-Potable Water.

Texas Commission on Environmental Quality Certificate/Lab ID: T104704476-09-1. NELAP Accredited.
Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664, 200.7, 200.8, 245.1, 245.2, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1, 6010, 6020, 7196, 7470, 9040, SM 2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 426C, 4500CL-E, 4500CN-E, 4500F-C, 4500H+B, 4500NH3-H, 4500NO2B, 4500P-E, 4500 S²⁻D, 510C, 5210B, 5220D, 5310C, 5540C. Organic Parameters: EPA 608, 624, 625, 8081, 8082, 8151, 8260, 8270, 8330.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 1312, 9012, 9014, 9040, 9045, 9050, 9065.)

Virginia Division of Consolidated Laboratory Services Certificate/Lab ID: 460195. NELAP Accredited.
Drinking Water (Inorganic Parameters: EPA 200.7, 200.8, 300.0, 2510B, 2120B, 2540C, 4500CN-CE, 245.2, 2320B, 4500F-C, 4500F-C, 4500NO3-F, 5310C. Organic Parameters: EPA 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664A, 200.7, 200.8, 245.1, 300.0, 3005A, 3015, 1312, 6010B, 6010C, 3060A, 353.2, 420.1, 6020, 6020A, SM4500S-D, SM4500-CN-CE, Lachat 10-204-00-1-X, 7196A, 7470A, 9010B, 9040B, 2310B, 2320B, 2510B, 2540B, 2540C, 3500Cr-D, 426C, 4500Cl-E, 4500F-B, 4500F-C, 4500PE, 510AC, 5210B, 5310B 5310C, 5540C. Organic Parameters: EPA 3510C, 3630C, 5030B, 8260B, 608, 624, 625, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330,)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010A, 1030, 3060A, 3050B, 1311, 1312, 6010B, 6010C, 6020, , 7196A, 7471A, 7471B, 6020A, 9030B, 9010B, 9012A, 9014 9040B, 9045C, 9050A, 9065. Organic Parameters: EPA 5035, 3540C, 3546, 3550, 3580, 3630C, 8260B, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330.)

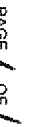
Department of Defense, L-A-B Certificate/Lab ID: L2217.
Drinking Water (Inorganic Parameters: SM 4500H-B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: EPA 200.7, 200.8, 6010B, 6010C, 6020, 6020A, 245.1, 245.2, 7470A, 9040B, 9010B, 180.1, 300.0, 332.0, 6860, 353.2, 410.4, 9060, 1664A, SM 4500CN-E, 4500H-B, 4500NO3-F, 4500CL-D, 5220D, 5310C, 2130B, 2320B, 2540C, 3005A, 3015, 9010B, 9056. Organic Parameters: EPA 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330A, 8082, 8082A, 8081A, 8081B, 3510C, 5030B, MassDEP EPH, MassDEP VPH.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 200.7, 6010B, 6010C, 7471A, 6860, 1311, 1312, 3050B, 7196A, 9010B, 9012A, 9040B, 9045C, 3500-CR-D, 4500CN-CE, 2540G, Organic Parameters: EPA 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330A/B-prep, 8082, 8082A, 8081A, 8081B, 3540C, 3546, 3580A, 5035A, MassDEP EPH, MassDEP VPH.)

The following analytes are not included in our current NELAP/TNI Scope of Accreditation:

EPA 8260B: Freon-113, 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene. **EPA 8330A:** PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT. **EPA 8270C:** Methyl naphthalene, Dimethyl naphthalene, Total Methylnaphthalenes, Total Dimethylnaphthalenes, 1,4-Diphenylhydrazine (Azobenzene). **EPA 625:** 4-Chloroaniline, 4-Methylphenol. Total Phosphorus in a soil matrix, Chloride in a soil matrix, TKN in a soil matrix, NO₂ in a soil matrix, NO₃ in a soil matrix, SO₄ in a soil matrix. **EPA 9071:** Total Petroleum Hydrocarbons, Oil & Grease



PAGE 1 OF 1

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Criteria

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turnaround time
start until now

submitted are resolved. All Alpha's Paym

and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

SOFT-TOE # 1A-10-



ANALYTICAL REPORT

Lab Number:	L1203602
Client:	Tighe & Bond, Inc. 446 Main Street Worcester, MA 01608
ATTN:	Jonathan Van Hazinga
Phone:	(508) 754-2201
Project Name:	IPSWICH WWTP
Project Number:	I-0066
Report Date:	03/09/12

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAC00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1203602
Report Date: 03/09/12

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1203602-01	PCB-01	IPSWICH, MA	03/02/12 09:35
L1203602-02	PCB-02	IPSWICH, MA	03/02/12 10:49
L1203602-03	PCB-03	IPSWICH, MA	03/02/12 11:25
L1203602-04	PCB-04	IPSWICH, MA	03/02/12 11:47

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1203602
Report Date: 03/09/12

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

Please see the associated ADEX data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

Please contact Client Services at 800-624-9220 with any questions.

PCB

L1203602-01, -02, and -03 have elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix and due to the dilutions required by the elevated concentrations of target compounds in the samples.

L1203602-03 and -04 have elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.

The surrogate recoveries for L1203602-01, -02, and -03 are below the acceptance criteria for 2,4,5,6-Tetrachloro-m-xylene and Decachlorobiphenyl (all 0%) due to the dilutions required to quantitate the samples. Re-extraction was not required; therefore, the results of the original analysis are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Elizabeth Simmons

Title: Technical Director/Representative

Date: 03/09/12

ORGANICS



PCBS



Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

SAMPLE RESULTS

Lab ID: L1203602-01 D
 Client ID: PCB-01
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082
 Analytical Date: 03/09/12 10:59
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 09:35
 Date Received: 03/02/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 03/04/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 03/05/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 03/05/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	267000	--	5000
Aroclor 1221	ND		ug/kg	267000	--	5000
Aroclor 1232	ND		ug/kg	267000	--	5000
Aroclor 1242	ND		ug/kg	267000	--	5000
Aroclor 1248	ND		ug/kg	178000	--	5000
Aroclor 1260	ND		ug/kg	178000	--	5000
Aroclor 1262	ND		ug/kg	89100	--	5000
Aroclor 1268	ND		ug/kg	89100	--	5000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

SAMPLE RESULTS

Lab ID: L1203602-01 D
 Client ID: PCB-01
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082
 Analytical Date: 03/09/12 10:59
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 09:35
 Date Received: 03/02/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 03/04/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 03/05/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 03/05/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1254	2080000		ug/kg	267000	--	5000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

SAMPLE RESULTS

Lab ID: L1203602-02 D
 Client ID: PCB-02
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082
 Analytical Date: 03/09/12 11:15
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 10:49
 Date Received: 03/02/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 03/04/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 03/05/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 03/05/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	281000	--	5000
Aroclor 1221	ND		ug/kg	281000	--	5000
Aroclor 1232	ND		ug/kg	281000	--	5000
Aroclor 1242	ND		ug/kg	281000	--	5000
Aroclor 1248	ND		ug/kg	188000	--	5000
Aroclor 1260	ND		ug/kg	188000	--	5000
Aroclor 1262	ND		ug/kg	93800	--	5000
Aroclor 1268	ND		ug/kg	93800	--	5000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

SAMPLE RESULTS

Lab ID: L1203602-02 D
 Client ID: PCB-02
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082
 Analytical Date: 03/09/12 11:15
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 10:49
 Date Received: 03/02/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 03/04/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 03/05/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 03/05/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1254	2310000		ug/kg	281000	--	5000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

SAMPLE RESULTS

Lab ID: L1203602-03 D
 Client ID: PCB-03
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082
 Analytical Date: 03/08/12 15:22
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 11:25
 Date Received: 03/02/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 03/04/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 03/05/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 03/05/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	27700	--	500
Aroclor 1221	ND		ug/kg	27700	--	500
Aroclor 1232	ND		ug/kg	27700	--	500
Aroclor 1242	ND		ug/kg	27700	--	500
Aroclor 1248	ND		ug/kg	18400	--	500
Aroclor 1254	610000		ug/kg	27700	--	500
Aroclor 1260	ND		ug/kg	18400	--	500
Aroclor 1262	ND		ug/kg	9220	--	500
Aroclor 1268	ND		ug/kg	9220	--	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150
Decachlorobiphenyl	0	Q	30-150



Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

SAMPLE RESULTS

Lab ID: L1203602-04

Date Collected: 03/02/12 11:47

Client ID: PCB-04

Date Received: 03/02/12

Sample Location: IPSWICH, MA

Field Prep: Not Specified

Matrix: Solid

Extraction Method: EPA 3540C

Analytical Method: 1,8082

Extraction Date: 03/04/12 11:00

Analytical Date: 03/08/12 14:29

Cleanup Method1: EPA 3665A

Analyst: KB

Cleanup Date1: 03/05/12

Percent Solids: Results reported on an 'AS RECEIVED' basis.

Cleanup Method2: EPA 3660B

Cleanup Date2: 03/05/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1016	ND		ug/kg	53.0	--	1
Aroclor 1221	ND		ug/kg	53.0	--	1
Aroclor 1232	ND		ug/kg	53.0	--	1
Aroclor 1242	ND		ug/kg	53.0	--	1
Aroclor 1248	ND		ug/kg	35.3	--	1
Aroclor 1260	ND		ug/kg	35.3	--	1
Aroclor 1262	ND		ug/kg	17.7	--	1
Aroclor 1268	ND		ug/kg	17.7	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	73		30-150
Decachlorobiphenyl	62		30-150
2,4,5,6-Tetrachloro-m-xylene	72		30-150
Decachlorobiphenyl	61		30-150



Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

SAMPLE RESULTS

Lab ID: L1203602-04
 Client ID: PCB-04
 Sample Location: IPSWICH, MA
 Matrix: Solid
 Analytical Method: 1,8082
 Analytical Date: 03/08/12 14:29
 Analyst: KB
 Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 03/02/12 11:47
 Date Received: 03/02/12
 Field Prep: Not Specified
 Extraction Method: EPA 3540C
 Extraction Date: 03/04/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 03/05/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 03/05/12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB by GC - Westborough Lab						
Aroclor 1254	198		ug/kg	53.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	73		30-150
Decachlorobiphenyl	62		30-150
2,4,5,6-Tetrachloro-m-xylene	72		30-150
Decachlorobiphenyl	61		30-150



Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082
 Analytical Date: 03/06/12 01:39
 Analyst: KB

Extraction Method: EPA 3540C
 Extraction Date: 03/04/12 11:00
 Cleanup Method1: EPA 3665A
 Cleanup Date1: 03/05/12
 Cleanup Method2: EPA 3660B
 Cleanup Date2: 03/05/12

Parameter	Result	Qualifier	Units	RL	MDL
PCB by GC - Westborough Lab for sample(s): 01-04 Batch: WG521305-1					
Aroclor 1016	ND		ug/kg	19.4	--
Aroclor 1221	ND		ug/kg	19.4	--
Aroclor 1232	ND		ug/kg	19.4	--
Aroclor 1242	ND		ug/kg	19.4	--
Aroclor 1248	ND		ug/kg	12.9	--
Aroclor 1254	ND		ug/kg	19.4	--
Aroclor 1260	ND		ug/kg	12.9	--
Aroclor 1262	ND		ug/kg	6.46	--
Aroclor 1268	ND		ug/kg	6.46	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	76		30-150
Decachlorobiphenyl	84		30-150
2,4,5,6-Tetrachloro-m-xylene	82		30-150
Decachlorobiphenyl	88		30-150



Lab Control Sample Analysis

Batch Quality Control

Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB by GC - Westborough Lab Associated sample(s): 01-04 Batch: WG521305-2 WG521305-3								
Aroclor 1016	74		71		40-140	4		50
Aroclor 1260	72		73		40-140	1		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,5,6-Tetrachloro-m-xylene	85		81		30-150
Decachlorobiphenyl	94		92		30-150
2,4,5,6-Tetrachloro-m-xylene	89		86		30-150
Decachlorobiphenyl	106		95		30-150

Project Name: IPSWICH WWTP

Lab Number: L1203602

Project Number: I-0066

Report Date: 03/09/12

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information Custody Seal**Cooler**

A Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1203602-01A	Amber 250ml unpreserved	A	N/A	5	Y	Absent	PCB-8082LL-3540C(14)
L1203602-02A	Amber 250ml unpreserved	A	N/A	5	Y	Absent	PCB-8082LL-3540C(14)
L1203602-03A	Amber 250ml unpreserved	A	N/A	5	Y	Absent	PCB-8082LL-3540C(14)
L1203602-04A	Amber 250ml unpreserved	A	N/A	5	Y	Absent	PCB-8082LL-3540C(14)

*Values in parentheses indicate holding time in days



Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1203602
Report Date: 03/09/12

GLOSSARY

Acronyms

EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than five times (5x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

Report Format: Data Usability Report



Project Name: IPSWICH WWTP**Lab Number:** L1203602**Project Number:** I-0066**Report Date:** 03/09/12**Data Qualifiers**

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name: IPSWICH WWTP
Project Number: I-0066

Lab Number: L1203602
Report Date: 03/09/12

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certificate/Approval Program Summary

Last revised January 30, 2012 - Westboro Facility

The following list includes only those analytes/methods for which certification/approval is currently held.
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

Connecticut Department of Public Health Certificate/Lab ID: PH-0574. NELAP Accredited Solid Waste/Soil.

Drinking Water (Inorganic Parameters: Color, pH, Turbidity, Conductivity, Alkalinity, Chloride, Free Residual Chlorine, Fluoride, Calcium Hardness, Sulfate, Nitrate, Nitrite, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc, Total Dissolved Solids, Total Organic Carbon, Total Cyanide, Perchlorate. Organic Parameters: Volatile Organics 524.2, Total Trihalomethanes 524.2, 1,2-Dibromo-3-chloropropane (DBCP), Ethylene Dibromide (EDB), 1,4-Dioxane (Mod 8270). Microbiology Parameters: Total Coliform-MF mEndo (SM9222B), Total Coliform – Colilert (SM9223 P/A), E. Coli. – Colilert (SM9223 P/A), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D))

Wastewater/Non-Potable Water (Inorganic Parameters: Color, pH, Conductivity, Acidity, Alkalinity, Chloride, Total Residual Chlorine, Fluoride, Total Hardness, Silica, Sulfate, Sulfide, Ammonia, Kjeldahl Nitrogen, Nitrate, Nitrite, O-Phosphate, Total Phosphorus, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Dissolved Solids, Total Suspended Solids (non-filterable), BOD, CBOD, COD, TOC, Total Cyanide, Phenolics, Foaming Agents (MBAS), Bromide, Oil and Grease. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, 2,4-D, 2,4,5-T, 2,4,5-TP(Silvex), Acid Extractables (Phenols), Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, Polynuclear Aromatic Hydrocarbons, Haloethers, Chlorinated Hydrocarbons, Volatile Organics, TPH (HEM/SGT), Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH. Microbiology Parameters: Total Coliform – MF mEndo (SM9222B), Total Coliform – MTF (SM9221B), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform – A-1 Broth (SM9221E).)

Solid Waste/Soil (Inorganic Parameters: pH, Sulfide, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Tin, Vanadium, Zinc, Total Cyanide, Ignitability, Phenolics, Corrosivity, TCLP Leach (1311), SPLP Leach (1312 metals only), Reactivity. Organic Parameters: PCBs, PCBs in Oil, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH, Dicamba, 2,4-D, 2,4,5-T, 2,4,5-TP(Silvex), Volatile Organics, Acid Extractables (Phenols), 3,3'-Dichlorobenzidine, Phthalates, Nitrosamines, Nitroaromatics & Cyclic Ketones, PAHs, Haloethers, Chlorinated Hydrocarbons.)

Maine Department of Human Services Certificate/Lab ID: 2009024.

Drinking Water (Inorganic Parameters: SM9215B, 9222D, 9223B, EPA 180.1, 353.2, SM2130B, 2320B, 2540C, 4500CI-D, 4500CN-C, 4500CN-E, 4500F-C, 4500H+B, 4500NO3-F, EPA 200.7, EPA 200.8, 245.1, EPA 300.0. Organic Parameters: 504.1, 524.2.)

Wastewater/Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664A, 350.1, 351.1, 353.2, 410.4, 420.1, SM2320B, 2510B, 2540C, 2540D, 426C, 4500CI-D, 4500CI-E, 4500CN-C, 4500CN-E, 4500F-B, 4500F-C, 4500H+B, 4500Norg-B, 4500Norg-C, 4500NH3-B, 4500NH3-G, 4500NH3-H, 4500NO3-F, 4500P-B, 4500P-E, 5210B, 5220D, 5310C, 9010B, 9040B, 9030B, 7470A, 7196A, 2340B, EPA 200.7, 6010, 200.8, 6020, 245.1, 1311, 1312, 3005A, Enterolert, 9223D, 9222D. Organic Parameters: 608, 8081, 8082, 8330, 8151A, 624, 8260, 3510C, 3630C, 5030B, ME-DRO, ME-GRO, MA-EPH, MA-VPH.)

Solid Waste/Soil (Inorganic Parameters: 9010B, 9012A, 9014A, 9040B, 9045C, 6010B, 7471A, 7196A, 9050A, 1010, 1030, 9065, 1311, 1312, 3005A, 3050B. Organic Parameters: ME-DRO, ME-GRO, MA-EPH, MA-VPH, 8260B, 8270C, 8330, 8151A, 8081A, 8082, 3540C, 3546, 3580A, 3630C, 5030B, 5035.)

Massachusetts Department of Environmental Protection Certificate/Lab ID: M-MA086.

Drinking Water (Inorganic Parameters: (EPA 200.8 for: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl) (EPA 200.7 for: Ba,Be,Ca,Cd,Cr,Cu,Na,Ni) 245.1, (300.0 for: Nitrate-N, Fluoride, Sulfate); (EPA 353.2 for: Nitrate-N, Nitrite-N); (SM4500NO3-F for: Nitrate-N and Nitrite-N); 4500F-C, 4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, 2320B, SM2540C, SM4500H-B. Organic Parameters: (EPA 524.2 for: Trihalomethanes, Volatile Organics); (504.1 for: 1,2-Dibromoethane, 1,2-Dibromo-3-Chloropropane), EPA 332. Microbiology Parameters: SM9215B; ENZ. SUB. SM9223; ColilertQT SM9223B; MF-SM9222D.)

Page 19 of 22 *Non-Potable Water* (Inorganic Parameters: (EPA 200.8 for: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn); (EPA 200.7 for: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn); 245.1, SM4500H,B, EPA 120.1,

SM2510B, 2540C, 2340B, 2320B, 4500CL-E, 4500F-BC, 426C, SM4500NH3-BH, (EPA 350.1 for: Ammonia-N), LACHAT 10-107-06-1-B for Ammonia-N, SM4500NO3-F, 353.2 for Nitrate-N, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, 4500P-B,E, 5220D, EPA 410.4, SM 5210B, 5310C, 4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.

Organic Parameters: (EPA 624 for Volatile Halocarbons, Volatile Aromatics), (608 for: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs-Water), (EPA 625 for SVOC Acid Extractables and SVOC Base/Neutral Extractables), 600/4-81-045-PCB-Oil. Microbiology Parameters: (ColilertQT SM9223B; Enterolert-QT: SM9222D-MF.)

New Hampshire Department of Environmental Services Certificate/Lab ID: 200307. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM 9222B, 9223B, 9215B, EPA 200.7, 200.8, 245.2, 300.0, SM4500CN-E, 4500H+B, 4500NO3-F, 2320B, 2510B, 2540C, 4500F-C, 5310C, 2120B, EPA 332.0. Organic Parameters: 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: SM9222D, 9221B, 9222B, 9221E-EC, EPA 3005A, 200.7, 200.8, 245.1, 245.2, SW-846 6010B, 6020, 7196A, 7470A, SM3500-CR-D, EPA 120.1, 300.0, 350.1, 350.2, 351.1, 353.2, 410.4, 420.1, 1664A, SW-846 9010, 9030, 9040B, SM426C, SM2120B, 2310B, 2320B, 2540B, 2540D, 4500H+B, 4500CL-E, 4500CN-E, 4500NH3-H, 4500NO3-F, 4500NO2-B, 4500P-E, 4500-S2-D, 5210B, 5220D, 2510B, 2540C, 4500F-C, 5310C, 5540C, LACHAT 10-204-00-1-A, LACHAT 10-107-06-2-D. Organic Parameters: SW-846 3510C, 3630C, 5030B, 8260B, 8270C, 8330, EPA 624, 625, 608, SW-846 8082, 8081A, 8151A.)

Solid & Chemical Materials (Inorganic Parameters: SW-846 6010B, 7196A, 7471A, 1010, 1030, 9010, 9012A, 9014, 9030B, 9040B, 9045C, 9050C, 9065, 1311, 1312, 3005A, 3050B. Organic Parameters: SW-846 3540C, 3546, 3550B, 3580A, 3630C, 5030B, 5035, 8260B, 8270C, 8330, 8151A, 8015B, 8082, 8081A.)

New Jersey Department of Environmental Protection Certificate/Lab ID: MA935. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM9222B, 9221E, 9223B, 9215B, 4500CN-CE, 4500NO3-F, 4500F-C, EPA 300.0, 200.7, 200.8, 245.2, 2540C, SM2120B, 2320B, 2510B, 5310C, SM4500H-B. Organic Parameters: EPA 332, 504.1, 524.2.)

Non-Potable Water (Inorganic Parameters: SM5210B, EPA 410.4, SM5220D, 4500CI-E, EPA 300.0, SM2120B, SM4500F-BC, EPA 200.7, 351.1, LACHAT 10-107-06-2-D, EPA 353.2, SM4500NO3-F, 4500NO2-B, EPA 1664A, SM5310B, C or D, 4500-PE, EPA 420.1, SM510ABC, SM4500P-B5+E, 2540B, 2540C, 2540D, EPA 120.1, SM2510B, SM15 426C, 9222D, 9221B, 9221C, 9221E, 9222B, 9215B, 2310B, 2320B, 4500NH3-H, 4500-S D, EPA 350.1, 350.2, SW-846 1312, 6020, 6020A, 7470A, 5540C, 4500H-B, EPA 200.8, SM3500Cr-D, 4500CN-CE, EPA 245.1, 245.2, SW-846 9040B, 3005A, 3015, EPA 6010B, 6010C, 7196A, 3060A, SW-846 9010B, 9030B. Organic Parameters: SW-846 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3510C, EPA 608, 624, 625, SW-846 3630C, 5030B, 8081A, 8081B, 8082, 8082A, 8151A, 8330, NJ OQA-QAM-025 Rev.7, NJ EPH.)

Solid & Chemical Materials (Inorganic Parameters: SW-846, 6010B, 6010C, 7196A, 3060A, 9010B, 9030B, 1010, 1030, 1311, 1312, 3005A, 3050B, 7471A, 7471B, 9014, 9012A, 9040B, 9045C, 9050A, 9065. Organic Parameters: SW-846 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 8260B, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3540C, 3545, 3546, 3550B, 3580A, 3630C, 5030B, 5035L, 5035H, NJ OQA-QAM-025 Rev.7, NJ EPH.)

New York Department of Health Certificate/Lab ID: 11148. *NELAP Accredited.*

Drinking Water (Inorganic Parameters: SM9223B, 9222B, 9215B, EPA 200.8, 200.7, 245.2, SM5310C, EPA 332.0, SM2320B, EPA 300.0, SM2120B, 4500CN-E, 4500F-C, 4500H-B, 4500NO3-F, 2540C, SM 2510B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: SM9221E, 9222D, 9221B, 9222B, 9215B, 5210B, 5310C, EPA 410.4, SM5220D, 2310B-4a, 2320B, EPA 200.7, 300.0, SM4500CL-E, 4500F-C, SM15 426C, EPA 350.1, SM4500NH3-BH, EPA 351.1, LACHAT 10-107-06-2, EPA 353.2, LACHAT 10-107-04-1-C, SM4500-NO3-F, 4500-NO2-B, 4500P-E, 2540C, 2540B, 2540D, EPA 200.8, EPA 6010B, 6020, EPA 7196A, SM3500Cr-D, EPA 245.1, 245.2, 7470A, SM2120B, LACHAT 10-204-00-1-A, EPA 9040B, SM4500-HB, EPA 1664A, EPA 420.1, SM14 510C, EPA 120.1, SM2510B, SM4500S-D, SM5540C, EPA 3005A, 9010B, 9030B. Organic Parameters: EPA 624, 8260B, 8270C, 625, 608, 8081A, 8151A, 8330, 8082, EPA 3510C, 5030B.)

Solid & Hazardous Waste (Inorganic Parameters: 1010, 1030, EPA 6010B, 7196A, 7471A, 9012A, 9014, 9040B, 9045C, 9065, 9050, EPA 1311, 1312, 3005A, 3050B, 9010B, 9030B. Organic Parameters: EPA 8260B, 8270C, 8015B, 8081A, 8151A, 8330, 8082, 3540C, 3545, 3546, 3580, 5030B, 5035.)

North Carolina Department of the Environment and Natural Resources Certificate/Lab ID : 666. Organic Parameters: MA-EPH, MA-VPH.

Pennsylvania Department of Environmental Protection Certificate/Lab ID: 68-03671. *NELAP Accredited.**Drinking Water (Inorganic Parameters: EPA 524.2, 504.1)**Non-Potable Water (Inorganic Parameters: EPA 1312, 200.7, 410.4, 1664A, SM2540D, 5210B, 5220D, 4500-P, BE. Organic Parameters: EPA 3510C, 3005A, 3630C, 5030B, 625, 624, 608, 8081A, 8081B, 8082, 802A, 8151A, 8260B, 8270C, 8270D, 8330)**Solid & Hazardous Waste (Inorganic Parameters: EPA 350.1, 1010, 1030, 1311, 1312, 3050B, 3060A, 6010B, 6010C, 7196A, 7471A, 9010B, 9012A, 9014, 9040B, 9045C, 9050, 9065, SM 4500NH3-H. Organic Parameters: 3540C, 3546, 3580A, 3630C, 5035, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8260B, 8270C, 8270D, 8330)***Rhode Island Department of Health Certificate/Lab ID: LAO00065. *NELAP Accredited via NY-DOH.***

Refer to MA-DEP Certificate for Potable and Non-Potable Water.

Refer to NJ-DEP Certificate for Potable and Non-Potable Water.

Texas Commission on Environmental Quality Certificate/Lab ID: T104704476-09-1. *NELAP Accredited.**Non-Potable Water (Inorganic Parameters: EPA 120.1, 1664, 200.7, 200.8, 245.1, 245.2, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1, 6010, 6020, 7196, 7470, 9040, SM 2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 426C, 4500CL-E, 4500CN-E, 4500F-C, 4500H+B, 4500NH3-H, 4500NO2B, 4500P-E, 4500 S²⁻D, 510C, 5210B, 5220D, 5310C, 5540C. Organic Parameters: EPA 608, 624, 625, 8081, 8082, 8151, 8260, 8270, 8330.)**Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 1312, 9012, 9014, 9040, 9045, 9050, 9065.)***Virginia Division of Consolidated Laboratory Services Certificate/Lab ID: 460195. *NELAP Accredited.****Non-Potable Water (Inorganic Parameters: EPA 3005A, 3015, 1312, 6010B, 6010C, SM4500S-D, SM4500-CN-CE, Lachat 10-204-00-1-X. Organic Parameters: EPA 8260B)**Solid & Hazardous Waste (Inorganic Parameters: EPA 3050B, 1311, 1312, 6010B, 6010C, 9030B, 9010B, 9012A, 9014. Organic Parameters: EPA 5035, 5030B, 8260B.)***Department of Defense, L-A-B Certificate/Lab ID: L2217.***Drinking Water (Inorganic Parameters: SM 4500H-B. Organic Parameters: EPA 524.2, 504.1.)**Non-Potable Water (Inorganic Parameters: EPA 200.7, 200.8, 6010B, 6020, 245.1, 245.2, 7470A, 9040B, 300.0, 332.0, 6860, 353.2, 410.4, 9060, 1664A, SM 4500CN-E, 4500H-B, 4500NO3-F, 5220D, 5310C, 2320B, 2540C, 3005A, 3015, 9010B, 9056. Organic Parameters: EPA 8260B, 8270C, 8330A, 625, 8082, 8081A, 3510C, 5030B, MassDEP EPH, MassDEP VPH.)**Solid & Hazardous Waste (Inorganic Parameters: EPA 200.7, 6010B, 7471A, 9010, 9012A, 6860, 1311, 1312, 3050B, 7196A, 9010B, 3500-CR-D, 4500CN-CE, 2540G, Organic Parameters: EPA 8260B, 8270C, 8330A/B-prep, 8082, 8081A, 3540C, 3546, 3580A, 5035A, MassDEP EPH, MassDEP VPH.)***The following analytes are not included in our current NELAP/TNI Scope of Accreditation:****EPA 8260B:** Freon-113, 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene. **EPA 8330A:** PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT. **EPA 8270C:** Methyl naphthalene, Dimethyl naphthalene, Total Methyl naphthalenes, Total Dimethyl naphthalenes, 1,4-Diphenylhydrazine (Azobenzene). **EPA 625:** 4-Chloroaniline, 4-Methylphenol. Total Phosphorus in a soil matrix, Chloride in a soil matrix, TKN in a soil matrix, NO₂ in a soil matrix, NO₃ in a soil matrix, SO₄ in a soil matrix.

ALPHA

CHAIN OF CUSTODY PAGE 1 OF 1

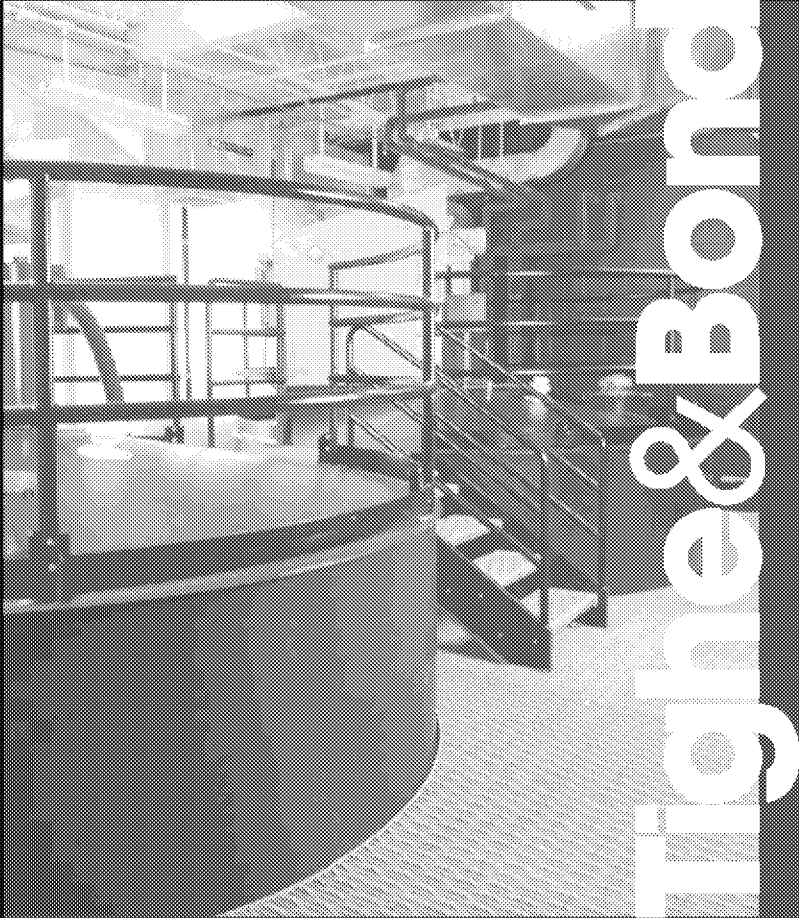
MAINSFIELD, MA
WESTBORO, MA
TEL: 508-858-9200 FAX: 508-852-3288
TEL: 508-852-9300 FAX: 508-852-3288

Project Information		Date Rec'd in Lab: 3/2/12		ALPHA Job #: U20362	
Project Name: INSURCH WWTB		Report Information - Data Deliverables		Billing Information	
Project Location: IPSURCH, MA		<input type="checkbox"/> FAX <input type="checkbox"/> EMAIL <input checked="" type="checkbox"/> ADEX <input type="checkbox"/> Add'l Deliverables		Same as Client info PO #:	
Client: TATE & BOND		Regulatory Requirements/Report Limits			
Address: 440 MAIN ST		State/Fed Program		Criteria	
WEESTON MA		FPA		TSCA	
Phone: 508.754.2201					
Fax:					
Email:					
<input type="checkbox"/> These samples have been previously analyzed by Alpha Other Project Specific Requirements/Comments/Detection Limits: DE < 1 ppm SECRET ESTIMATION					

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials	Container Type Preservative	Date/Time	Received By:	Date/Time
		Date	Time						
G3602-1	PUG-01	3/4/12	0835	S	QA	A			
2	PUG-02		1049	S	QA	A			
3	PUG-03		1125	S	QA	A			
4	PUG-04		1147	S	QA	A			

<input checked="" type="checkbox"/> Standard <input type="checkbox"/> RUSH (only confirmed if pre-approved) Date Due: 3/4/12 Time:		ANALYSIS [Grid area]	
SAMPLE HANDLING Filtration: _____ <input type="checkbox"/> Done <input checked="" type="checkbox"/> Not needed <input type="checkbox"/> Lab to do <input type="checkbox"/> Preservation <input type="checkbox"/> Lab to do (Please specify below)		Sample Specific Comments [Grid area]	

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.



May 14, 2015

Bettina Eames
Tighe & Bond-Portsmouth NH
177 Corporate Drive
Portsmouth, NH 03801

Project Location: Ipswich WWTP
Client Job Number:
Project Number: I-0066
Laboratory Work Order Number: 15E0181

Enclosed are results of analyses for samples received by the laboratory on May 5, 2015. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa Worthington", written in a cursive style.

Lisa A. Worthington
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Tighe & Bond-Portsmouth NH
177 Corporate Drive
Portsmouth, NH 03801
ATTN: Bettina Eames

REPORT DATE: 5/14/2015

PURCHASE ORDER NUMBER:

PROJECT NUMBER: I-0066

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 15E0181

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Ipswich WWTP

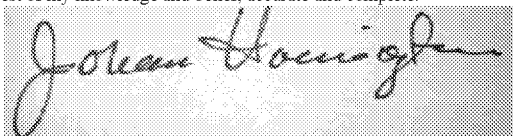
FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
Floor 1 PUF	15E0181-01	Indoor air		TO-10A/EPA 680 Modified	
Basement PUF	15E0181-02	Indoor air		TO-10A/EPA 680 Modified	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

A handwritten signature in black ink, appearing to read "Johanna Harrington", is written over a light gray, textured rectangular background.

Johanna K. Harrington

Manager, Laboratory Reporting

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

ANALYTICAL RESULTS

Project Location: Ipswich WWTP

Date Received: 5/5/2015

Field Sample #: Floor 1 PUF

Sample ID: 15E0181-01

Sample Matrix: Indoor air

Sampled: 5/5/2015 13:10

Sample Description/Location:

Sub Description/Location:

Flow Controller ID:

Sample Type:

Air Volume L: 1200

Work Order: 15E0181

TO-10A/EPA 680 Modified

Analyte	Total µg		Flag/Qual	ug/m3		Dilution	Date/Time		Analyst
	Results	RL		Results	RL		Analyzed		
Monochlorobiphenyls	ND	0.0010		ND	0.00083	1	5/8/15 12:33	CJM	
Dichlorobiphenyls	0.0072	0.0010		0.006	0.00083	1	5/8/15 12:33	CJM	
Trichlorobiphenyls	0.050	0.0010		0.042	0.00083	1	5/8/15 12:33	CJM	
Tetrachlorobiphenyls	0.41	0.0020		0.34	0.0017	1	5/8/15 12:33	CJM	
Pentachlorobiphenyls	0.85	0.0020		0.71	0.0017	1	5/8/15 12:33	CJM	
Hexachlorobiphenyls	0.20	0.0020		0.16	0.0017	1	5/8/15 12:33	CJM	
Heptachlorobiphenyls	0.0077	0.0030		0.0064	0.0025	1	5/8/15 12:33	CJM	
Octachlorobiphenyls	ND	0.0030		ND	0.0025	1	5/8/15 12:33	CJM	
Nonachlorobiphenyls	ND	0.0050		ND	0.0042	1	5/8/15 12:33	CJM	
Decachlorobiphenyl	ND	0.0050		ND	0.0042	1	5/8/15 12:33	CJM	
Total Polychlorinated biphenyls	1.5			1.3		1	5/8/15 12:33	CJM	
Surrogates	% Recovery			% REC Limits					
Tetrachloro-m-xylene	77.9			50-125			5/8/15 12:33		

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

ANALYTICAL RESULTS

Project Location: Ipswich WWTP

Date Received: 5/5/2015

Field Sample #: Basement PUF

Sample ID: 15E0181-02

Sample Matrix: Indoor air

Sampled: 5/5/2015 13:15

Sample Description/Location:

Sub Description/Location:

Flow Controller ID:

Sample Type:

Air Volume L: 1200

Work Order: 15E0181

TO-10A/EPA 680 Modified

Analyte	Total µg		Flag/Qual	ug/m3		Dilution	Date/Time		Analyst
	Results	RL		Results	RL		Analyzed		
Monochlorobiphenyls	ND	0.0010		ND	0.00083	1	5/8/15 13:02	CJM	
Dichlorobiphenyls	0.041	0.0010		0.034	0.00083	1	5/8/15 13:02	CJM	
Trichlorobiphenyls	0.26	0.0010		0.21	0.00083	1	5/8/15 13:02	CJM	
Tetrachlorobiphenyls	1.5	0.0020		1.2	0.0017	1	5/8/15 13:02	CJM	
Pentachlorobiphenyls	2.8	0.0020		2.3	0.0017	1	5/8/15 13:02	CJM	
Hexachlorobiphenyls	0.54	0.0020		0.45	0.0017	1	5/8/15 13:02	CJM	
Heptachlorobiphenyls	0.021	0.0030		0.018	0.0025	1	5/8/15 13:02	CJM	
Octachlorobiphenyls	ND	0.0030		ND	0.0025	1	5/8/15 13:02	CJM	
Nonachlorobiphenyls	ND	0.0050		ND	0.0042	1	5/8/15 13:02	CJM	
Decachlorobiphenyl	ND	0.0050		ND	0.0042	1	5/8/15 13:02	CJM	
Total Polychlorinated biphenyls	5.1			4.2		1	5/8/15 13:02	CJM	
Surrogates	% Recovery			% REC Limits					
Tetrachloro-m-xylene	68.6			50-125			5/8/15 13:02		

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method: SW-846 3540C-TO-10A/EPA 680 Modified

Lab Number [Field ID]	Batch	Initial [Cartridge	Final [mL]	Date
15E0181-01 [Floor 1 PUF]	B121216	1.00	1.00	05/07/15
15E0181-02 [Basement PUF]	B121216	1.00	1.00	05/07/15

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

PCB Homologues by GC/MS with Soxhlet Extraction - Quality Control

Analyte	Total µg		ug/m3		Spike Level	Source	%REC	%REC Limits	RPD	RPD Limit	Flag/Qual
	Results	RL	Results	RL	Total µg	Result					

Batch B121216 - SW-846 3540C

Blank (B121216-BLK1)

Prepared: 05/07/15 Analyzed: 05/08/15

Monochlorobiphenyls	ND	0.0010
Dichlorobiphenyls	ND	0.0010
Trichlorobiphenyls	ND	0.0010
Tetrachlorobiphenyls	ND	0.0020
Pentachlorobiphenyls	ND	0.0020
Hexachlorobiphenyls	ND	0.0020
Heptachlorobiphenyls	ND	0.0030
Octachlorobiphenyls	ND	0.0030
Nonachlorobiphenyls	ND	0.0050
Decachlorobiphenyl	ND	0.0050
Total Polychlorinated biphenyls	0.0	

Surrogate: Tetrachloro-m-xylene 0.153 0.200 76.3 50-125

LCS (B121216-BS1)

Prepared: 05/07/15 Analyzed: 05/08/15

Monochlorobiphenyls	0.14	0.0010	0.200	69.7	40-140
Dichlorobiphenyls	0.15	0.0010	0.200	75.4	40-140
Trichlorobiphenyls	0.16	0.0010	0.200	79.6	40-140
Tetrachlorobiphenyls	0.33	0.0020	0.400	81.8	40-140
Pentachlorobiphenyls	0.37	0.0020	0.400	91.7	40-140
Hexachlorobiphenyls	0.34	0.0020	0.400	84.8	40-140
Heptachlorobiphenyls	0.55	0.0030	0.600	91.0	40-140
Octachlorobiphenyls	0.49	0.0030	0.600	81.8	40-140
Nonachlorobiphenyls	0.88	0.0050	1.00	87.8	40-140
Decachlorobiphenyl	0.72	0.0050	1.00	72.4	40-140

Surrogate: Tetrachloro-m-xylene 0.178 0.200 89.0 50-125

LCS Dup (B121216-BSD1)

Prepared: 05/07/15 Analyzed: 05/08/15

Monochlorobiphenyls	0.14	0.0010	0.200	67.7	40-140	2.88	50
Dichlorobiphenyls	0.15	0.0010	0.200	72.8	40-140	3.62	50
Trichlorobiphenyls	0.15	0.0010	0.200	75.6	40-140	5.21	50
Tetrachlorobiphenyls	0.31	0.0020	0.400	77.4	40-140	5.48	50
Pentachlorobiphenyls	0.34	0.0020	0.400	84.7	40-140	7.93	50
Hexachlorobiphenyls	0.34	0.0020	0.400	84.5	40-140	0.437	50
Heptachlorobiphenyls	0.50	0.0030	0.600	83.0	40-140	9.14	50
Octachlorobiphenyls	0.48	0.0030	0.600	79.9	40-140	2.35	50
Nonachlorobiphenyls	0.78	0.0050	1.00	78.5	40-140	11.2	50
Decachlorobiphenyl	0.63	0.0050	1.00	62.8	40-140	14.1	50

Surrogate: Tetrachloro-m-xylene 0.154 0.200 77.2 50-125

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

FLAG/QUALIFIER SUMMARY

- * QC result is outside of established limits.
- † Wide recovery limits established for difficult compound.
- ‡ Wide RPD limits established for difficult compound.
- # Data exceeded client recommended or regulatory level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
---------	----------------

TO-10A/EPA 680 Modified in Air

Total Polychlorinated biphenyls AIHA

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2016
MA	Massachusetts DEP	M-MA100	06/30/2015
CT	Connecticut Department of Public Health	PH-0567	09/30/2015
NY	New York State Department of Health	10899 NELAP	04/1/2016
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2016
RI	Rhode Island Department of Health	LAO00112	12/30/2015
NC	North Carolina Div. of Water Quality	652	12/31/2015
NJ	New Jersey DEP	MA007 NELAP	06/30/2015
FL	Florida Department of Health	E871027 NELAP	06/30/2015
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2015
WA	State of Washington Department of Ecology	C2065	02/23/2016
ME	State of Maine	2011028	06/9/2015
VA	Commonwealth of Virginia	460217	12/14/2015
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2015



www.contestlabs.com



Page 1 of 2

39 Spruce St.
East Longmeadow, MA.
01028
P: 413-525-2332
F: 413-525-6405

AIR Only Receipt Checklist

CLIENT NAME: Tighe & Bond RECEIVED BY: KB DATE: 5/5/15

1) Was the chain(s) of custody relinquished and signed?

☒ Yes

No

2) Does the chain agree with the samples?

☒ Yes

No

If not, explain:

3) Are all the samples in good condition?

☒ Yes

No

If not, explain:

4) Are there any samples "On Hold"?

Yes

☒ No

Stored where:

5) Are there any RUSH or SHORT HOLDING TIME samples?

Yes

☒ No

Who was notified _____ Date _____ Time _____

6) Location where samples are stored:

Walk In

Permission to subcontract samples? Yes No
(Walk-in clients only) if not already approved
Client Signature: _____

7) Number of cans Individually Certified or Batch Certified? _____

Containers received at Con-Test

	# of Containers	Types (Size, Duration)
Summa Cans (TO-14/TO-15/APH)		
Tedlar Bags		
TO-17 Tubes		
Regulators		
Restrictors		
Hg/Hopcalite Tube (NIOSH 6009)		
(TO-4A/TO-10A/TO-13) PUFs	2	Low vol.
PCB Florisil Tubes (NIOSH 5503)		
Air cassette		
PM 2.5/PM 10		
TO-11A Cartridges		
Other		

Unused Summas/PUF Media:

Unused Regulators:

1) Was all media (used & unused) checked into the WASP?

2) Were all returned summa cans, Restrictors & Regulators and PUF's documented as returned in the Air Lab Inbound/Outbound Excel Spreadsheet?

Yes (KM)

Laboratory Comments: Lot: 050115-01
-02

Page 2 of 2

Login Sample Receipt Checklist(Rejection Criteria Listing - Using Sample Acceptance Policy)Any False statement will be brought to the attention of Client

<u>Question</u>	<u>Answer (True/False)</u>	<u>Comment</u>
	<u>T/F/NA</u>	
1) The coolers'/boxes' custody seal, if present, is intact.	NA	
2) The cooler or samples do not appear to have been compromised or tampered with.	T	
3) Samples were received on ice.	T	
4) Cooler Temperature is acceptable.	T	
5) Cooler Temperature is recorded.	T	
6) COC is filled out in ink and legible.	T	
7) COC is filled out with all pertinent information.	T	
8) Field Sampler's name present on COC.	T	
9) Samples are received within Holding Time.	T	
10) Sample containers have legible labels.	T	
11) Containers/media are not broken or leaking and valves and caps are closed tightly.	T	
12) Sample collection date/times are provided.	T	
13) Appropriate sample/media containers are used.	T	
14) There is sufficient volume for all requested analyses, including any requested MS/MSDs.	T	
15) Trip blanks provided if applicable.	NA	

Doc #278 Rev. 5 October 2014

Who notified of False statements?

Log-In Technician Initials:

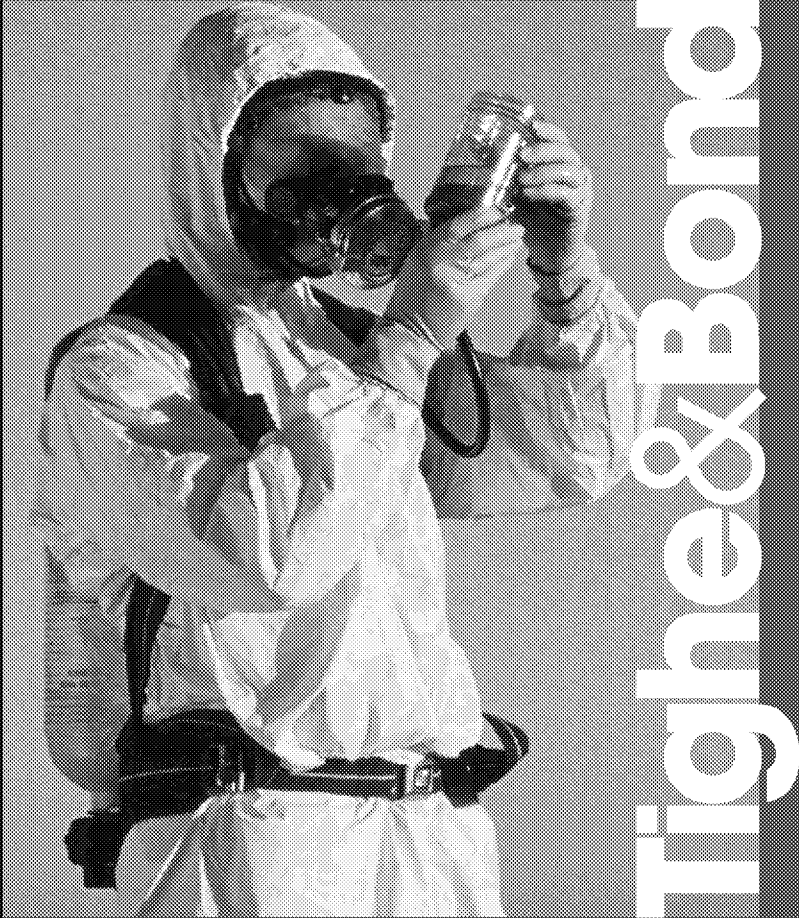
KB

Date/Time:

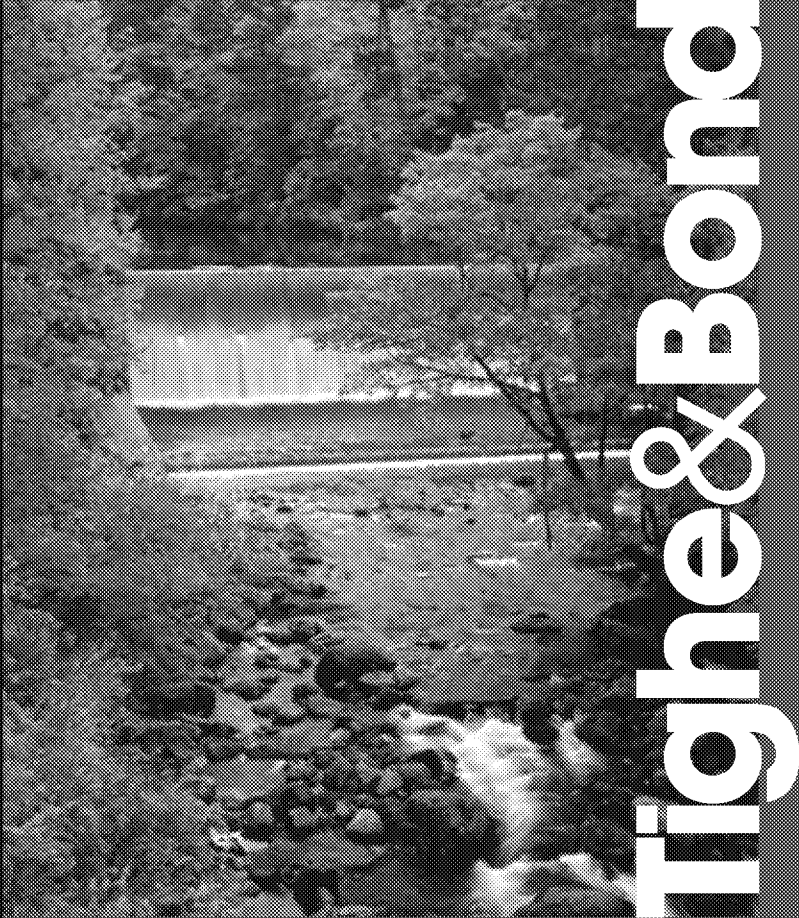
Date/Time:

5/5/15

17:40



UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number MF 178356642		2. Page 1 of 1	3. Emergency Response Phone 878-216-2345		4. Manifest Tracking Number 000695486 VES		
5. Generator's Name and Mailing Address TOWN OF WESTBURY SOLIDS HANDLING SYSTEMS INC. 356642 POWER PLANT 1000 BALMER ROAD WESTBURY, MA 01581					Generator's Site Address (if different than mailing address) 1000 BALMER ROAD WESTBURY, MA 01581				
6. Transporter 1 Company Name ESOLIA TECHNICAL SOLUTIONS					U.S. EPA ID Number MA1838610000001010-1				
7. Transporter 2 Company Name HAZMAT Environmental Group Inc					U.S. EPA ID Number NY0980769947				
8. Designated Facility Name and Site Address WILM. CHEMICAL SERVICES LLC 1000 BALMER ROAD WESTBURY, NY 14133					U.S. EPA ID Number NY0980769947				
Facility's Phone: 716-338-1400									
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))			10. Containers No. Type		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	X	1. UN3471 POLYCHLORINATED BIPHENYLE, SOLID, 2, 1L 8Q			4 10		3636	L	800 800
	X	2. UN3471 POLYCHLORINATED BIPHENYLE SOLID, 2, 1L 8Q			2 10		364	L	800 800
		3.							
		4.							
14. Special Handling Instructions and Additional Information ADDITIONAL ATTACHED FOR ADDITIONAL INFORMATION OF CONSIGNEE 1. MF1838610000001010-1, MF1838610000001010-2, MF1838610000001010-3, MF1838610000001010-4 2. MF1838610000001010-1, MF1838610000001010-2 81661693									
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.									
Generator's/Officer's Printed/Typed Name * Vicki HAUMEN					Signature <i>[Signature]</i>		Month Day Year 07 24 13		
INTL	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____								
	Transporter signature (for exports only): _____								
TRANSPORTER	17. Transporter Acknowledgment of Receipt of Materials								
	Transporter 1 Printed/Typed Name Kenneth C. Raulststr					Signature <i>[Signature]</i>		Month Day Year 07 24 13	
DESIGNATED FACILITY	Transporter 2 Printed/Typed Name Charles Enelle					Signature <i>[Signature]</i>		Month Day Year 07 30 13	
	16. Discrepancy								
16a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection									
Manifest Reference Number: _____									
18b. Alternate Facility (or Generator) U.S. EPA ID Number _____									
Facility's Phone: _____									
18c. Signature of Alternate Facility (or Generator) _____ Month Day Year _____									
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)									
1. H132		2. H133		3.		4.			
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a									
Printed/Typed Name Richard Lo Bino					Signature <i>[Signature]</i>		Month Day Year 07 31 13		



Calculation Worksheet for Average Daily Exposure (ADE) - Basement Level
WWTP Worker Inside Former Digester Budiling (25-Year Chronic Exposure)

ADE Calculation: Non-Cancer - Chronic

Contaminant of Concern	EPC (ug/m ³)	RAF (unitless)	EF (days/yr)	ED (hrs/day)	EP (years)	CF (year/hr)	AP (years)	ADE (ug/m ³)	Inhalation RfC		Hazard Index (HI)
									(ug/m ³)	Source	
PCBs	4.2	1	12	0.50	25	1.1E-04	25	2.9E-03	2.00E-02	MassDEP, 2013	0.14
										EPA Risk Limit	1.0

Average Daily Exposure
Calculation

ADE_{worker} =

[EPC] x RAF x EF x ED x EP x CF

AP

Hazard Index
Calculation

HI_{inhalation} =

ADE_{worker}

RfC

Exposure Factors

EPC = Exposure-Point Concenration
AF = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
EP = Exposure Period
CF = Conversion Factor
AP = Averaging Period
RfC= Reference Concentration

Exposure Assumptions

4.2 ug/m3 based on Total PCBs in air in basement in May 2015.
Inhalation AF assumed to be 1.0 (100%).
12 days per year (1 day per month, 12 months per year)
30 minutes per day = 0.5 hrs per day
25 years
1.1408 x 10-4 years = 1 hour
Equal to EP (for non-cancer) = 25 years
Based on Chronic-Inhalation - 2.0 x 10-5 mg/m3 = 2.0 x 10-2 ug/m3
Source: EPA has not estalished an RfC for Aroclor 1016 of Arcolor 1254. (RfC Source is: MassDEP Chemical Health Effects Assessment Methodology and Method to Derive Allowable Ambient Limits (CHEM/AAL). See <http://www.mass.gov/dep/toxics/stypes/telaal.htm>

Calculation Worksheet for Average Daily Exposure (ADE) - First/Ground Floor Level
WWTP Worker Inside Former Digester Budiling (25-Year Chronic Exposure)

ADE Calculation: Non-Cancer - Chronic

Contaminant of Concern	EPC (ug/m³)	RAF (unitless)	EF (days/yr)	ED (hrs/day)	EP (years)	CF (year/hr)	AP (years)	ADE (ug/m³)	Inhalation RfC		Hazard Index (HI)
									(ug/m³)	Source	
PCBs	1.3	1	12	0.50	25	1.1E-04	25	8.9E-04	2.00E-02	MassDEP, 2013	0.04
										EPA Risk Limit	1.0

Average Daily Exposure

Calculation

ADE_{worker} =

[EPC] x RAF x EF x ED x EP x CF

AP

Hazard Index

Calculation

HI_{inhalation} =

ADE_{worker}

RfC

Exposure Factors

EPC = Exposure-Point Concntration
AF = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
EP = Exposure Period
CF = Conversion Factor
AP = Averaging Period
RfC= Reference Concentration

Exposure Assumptions

1.3 ug/m3 based on Total PCBs in air in first/ground floor in May 2015.
Inhalation AF assumed to be 1.0 (100%).
12 days per year (1 day per month, 12 months per year)
30 minutes per day = 0.5 hrs per day
25 years
1.1408 x 10-4 years = 1 hour
Equal to EP (for non-cancer) = 25 years
Based on Chronic-Inhalation - 2.0 x 10-5 mg/m3 = 2.0 x 10-2 ug/m3
Source: EPA has not estalished an RfC for Aroclor 1016 of Arcolor 1254. (RfC Source is: MassDEP Chemical Health Effects Assessment Methodology and Method to Derive Allowable Ambient Limits (CHEM/AAL). See <http://www.mass.gov/dep/toxics/stypes/telaal.htm>

Calculation Worksheet for Lifetime Average Daily Exposure (LADE) - Basement Level
WWTP Worker Inside Former Digester Budiling (25-Year Cancer Risk)

LADE Calculation: Cancer Risk

Contaminant of Concern	EPC (ug/m³)	RAF (unitless)	EF (days/yr)	ED (hrs/day)	EP (years)	CF (year/hr)	AP (years)	LADE (ug/m³)	Inhalation Unit Risk Factor		ELCR
									(ug/m³)	Source	
PCBs	4.2	1	12	0.50	25	1.1E-04	70	1.0E-03	1.00E-04	IRIS, 2012	1.0E-07
										EPA Risk Limit	1.0E-06

Lifetime Average Daily Exposure
Calculation

LADE_{worker} =

[EPC] x RAF x EF x ED x EP x CF

AP

ELCR

Calculation

ELCR_{inhalation} =

LADE_{worker} x Unit Risk_{Inhalation}

Exposure Factors

EPC = Exposure-Point Concenration
AF = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
EP = Exposure Period
CF = Conversion Factor
AP = Averaging Period
URF = Unit Risk Factor

Exposure Assumptions

4.2 ug/m3 based on Total PCBs in air in basement in May 2015.
Inhalation AF assumed to be 1.0 (100%).
12 days per year (1 day per month, 12 months per year)
30 minutes per day = 0.5 hrs per day
25 years
1.1408 x 10-4 years = 1 hour
70 years (lifetime) - EPA (Source: 2014 - Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors)
Inhalation Cancer (Source: USEPA, Integrated Risk Information System (IRIS). Current as of May 2012.)

Calculation Worksheet for Lifetime Average Daily Exposure (LADE) - Basement Level
WWTP Worker Inside Former Digester Budiling (25-Year Cancer Risk)

LADE Calculation: Cancer Risk

Contaminant of Concern	EPC (ug/m ³)	RAF (unitless)	EF (days/yr)	ED (hrs/day)	EP (years)	CF (year/hr)	AP (years)	LADE (ug/m ³)	Inhalation Unit Risk Factor		ELCR
									(ug/m ³)	Source	
PCBs	1.3	1	12	0.50	25	1.1E-04	70	3.2E-04	1.00E-04	IRIS, 2012	3.2E-08
										EPA Risk Limit	1.0E-06

Lifetime Average Daily Exposure
Calculation

LADE_{worker} =

[EPC] x RAF x EF x ED x EP x CF

AP

ELCR

Calculation

ELCR_{inhalation} =

LADE_{worker} * Unit Risk_{Inhalation}

Exposure Factors

EPC = Exposure-Point Concenration
AF = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
EP = Exposure Period
CF = Conversion Factor
AP = Averaging Period
URF = Unit Risk Factor

Exposure Assumptions

1.3 ug/m3 based on Total PCBs in air in first/ground floor in May 2015.
Inhalation AF assumed to be 1.0 (100%).
12 days per year (1 day per month, 12 months per year)
30 minutes per day = 0.5 hrs per day
25 years
1.1408 x 10-4 years = 1 hour
70 years (lifetime) - EPA (Source: 2014 - Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors)
Inhalation Cancer (Source: USEPA, Integrated Risk Information System (IRIS). Current as of May 2012.)

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			7/3/2015 10:56:29 AM								
5	From File			PCBs_Hexane-DI Highest.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10	IPSWICH WWTO - Former Digester Building											
11	PCB Wipe Sample Concentrations (ug/100-cm2) - Higher of Hexane and DI-Water Sample Pairs											
12												
13	General Statistics											
14	Total Number of Observations				6		Number of Distinct Observations				6	
15							Number of Missing Observations				0	
16	Minimum				9.2		Mean				60.8	
17	Maximum				137		Median				65.4	
18	SD				45.9		Std. Error of Mean				18.74	
19	Coefficient of Variation				0.755		Skewness				0.696	
20												
21	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
22	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
23	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
24	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
25												
26	Normal GOF Test											
27	Shapiro Wilk Test Statistic				0.909		Shapiro Wilk GOF Test					
28	5% Shapiro Wilk Critical Value				0.788		Data appear Normal at 5% Significance Level					
29	Lilliefors Test Statistic				0.25		Lilliefors GOF Test					
30	5% Lilliefors Critical Value				0.362		Data appear Normal at 5% Significance Level					
31	Data appear Normal at 5% Significance Level											
32												
33	Assuming Normal Distribution											
34	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
35	95% Student's-t UCL				98.56		95% Adjusted-CLT UCL (Chen-1995)				97.31	
36							95% Modified-t UCL (Johnson-1978)				99.45	
37												
38	Gamma GOF Test											
39	A-D Test Statistic				0.397		Anderson-Darling Gamma GOF Test					
40	5% A-D Critical Value				0.707		Detected data appear Gamma Distributed at 5% Significance Level					
41	K-S Test Statistic				0.274		Kolmogrov-Smirnoff Gamma GOF Test					
42	5% K-S Critical Value				0.337		Detected data appear Gamma Distributed at 5% Significance Level					
43	Detected data appear Gamma Distributed at 5% Significance Level											
44												
45	Gamma Statistics											
46	k hat (MLE)				1.615		k star (bias corrected MLE)				0.918	
47	Theta hat (MLE)				37.65		Theta star (bias corrected MLE)				66.2	
48	nu hat (MLE)				19.38		nu star (bias corrected)				11.02	
49	MLE Mean (bias corrected)				60.8		MLE Sd (bias corrected)				63.44	
50						Approximate Chi Square Value (0.05)				4.59		
51	Adjusted Level of Significance				0.0122		Adjusted Chi Square Value				3.216	
52												

	A	B	C	D	E	F	G	H	I	J	K	L
53	Assuming Gamma Distribution											
54	95% Approximate Gamma UCL (use when n>=50))					146	95% Adjusted Gamma UCL (use when n<50)					208.4
55												
56	Lognormal GOF Test											
57	Shapiro Wilk Test Statistic					0.891	Shapiro Wilk Lognormal GOF Test					
58	5% Shapiro Wilk Critical Value					0.788	Data appear Lognormal at 5% Significance Level					
59	Lilliefors Test Statistic					0.3	Lilliefors Lognormal GOF Test					
60	5% Lilliefors Critical Value					0.362	Data appear Lognormal at 5% Significance Level					
61	Data appear Lognormal at 5% Significance Level											
62												
63	Lognormal Statistics											
64	Minimum of Logged Data					2.219	Mean of logged Data					3.767
65	Maximum of Logged Data					4.92	SD of logged Data					1.015
66												
67	Assuming Lognormal Distribution											
68	95% H-UCL					482.6	90% Chebyshev (MVUE) UCL					144.2
69	95% Chebyshev (MVUE) UCL					180.1	97.5% Chebyshev (MVUE) UCL					229.9
70	99% Chebyshev (MVUE) UCL					327.8						
71												
72	Nonparametric Distribution Free UCL Statistics											
73	Data appear to follow a Discernible Distribution at 5% Significance Level											
74												
75	Nonparametric Distribution Free UCLs											
76	95% CLT UCL					91.62	95% Jackknife UCL					98.56
77	95% Standard Bootstrap UCL					89.32	95% Bootstrap-t UCL					104.7
78	95% Hall's Bootstrap UCL					102	95% Percentile Bootstrap UCL					90.97
79	95% BCA Bootstrap UCL					90.97						
80	90% Chebyshev(Mean, Sd) UCL					117	95% Chebyshev(Mean, Sd) UCL					142.5
81	97.5% Chebyshev(Mean, Sd) UCL					177.8	99% Chebyshev(Mean, Sd) UCL					247.3
82												
83	Suggested UCL to Use											
84	95% Student's-t UCL					98.56						
85												
86	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
87	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
88	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
89	For additional insight the user may want to consult a statistician.											
90												

Tighe & Bond

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